Agilent N2620A
FrameScope Pro
Network Performance
Analyzer

User's Manual

Version 1.1

Agilent Technologies

Notices

Manual Part Number

N2620-90003

Edition

Warranty

Technology Licenses

Restricted Rights Legend

Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

In This Guide...

This user's guide contains information for using your FrameScope Pro handheld network performance analyzer.

Be sure to refer to any user's manual supplements or release notes that came with the unit or call your nearest technical support centre

Contents

1

Introducing the FrameScope Pro

The Agilent FrameScope Pro Network Performance Analyzer is a powerful handheld instrument that measures the performance of your key network resources and troubleshoots the active network equipments.

With the Voice Quality Analysis Option it allows to measure the performance of voice over VoIP network resources. The FrameScope Pro integrates network performance analyzer features such as auto discovery, network performance testing, traffic generator and fault finding; with wiremap testing feature.

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Safety Considerations

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument.

Agilent Technologies Inc. assumes no liability for the customer's failure to comply with these requirements.

Before operation, review the instrument and manual, including the red safety page, for safety markings and instructions. You must follow these to ensure safe operation and to maintain the instrument in safe condition.

This instrument is intended for indoor use.

This product is a Safety Class 1 instrument. Product is powered by an AC/DC adapter.

The protective features of this product may be impaired if it is used in a manner not specified in the operation instructions.

All Light Emitting Diodes (LEDs) used in this product are Class 1 LEDs as per IEC 60825-1

Environmental conditions

Refer to the Specificatins chapter, Environmental section.

Before applying power

Verify that the product is set to match the available line voltage, and all the safety precautions are taken.

Do not operate in an explosive atmosphere

Do not operate the instrument in the presence of flammable gases or fumes

Do not remove the instrument cover

Operating personel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified service personel. Instruments that

appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personel.

Laser Safety Information for optional Optical Transceivers

The laser sources specified by this user guide are classified according to IEC 60825-1 (2001)

The laser sources comply with 21 CFR 1040.10 except for deviations pursuant to Laser Notice No. 50, dated 2001-July-26.

Table 1   Initial Laser Safety Information

	HFBR-5701L/LP	HFCT-5710L/LP
• Laser Type	850nm VCSEL	Long wavelength
• Wavelength	830-860nm	1270-1355nm
• Max. average output power*	1mW	500µW
• Beam waist diameter	50-62.5µm	9 or 62.5µm
• Numerical aperture	0.2-0.275	0.2-0.275
• Laser class according to IEC • 60825-1 (2001)	Class 1	Class 1
• Max. permissible average output power**	0.8 mW	15,6mW

* Max. average output power means the highest possible optical CW power thet the laser source can produce at its output

** Max. permissible CW output power is the highest optical power that is permitted within the appropriate IEC laser class

Laser Class 1 Label

CLASS 1 LASER PRODUCT
(IEC 60825-1 / 2001)
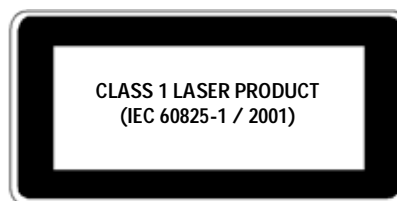
<table>
<tr><td>**WARNING**</td><td>

Please pay attention to the following laser safety warnings:

1. Under no circumstances look into the end of an optical cable attached to the optical output when the device is operating. The laser radiation can seriously damage your eyesight

2. Do not enable laser when there is no fiber attached to the optical output connector.

3. The use of optical instruments with this product will increase eye hazard.

4. The laser module has a built-in safety circuitry which will disable the optical output in the case of a fault condition

5. Refer servicing only to qualified and authorised personnel.

</td></tr>
</table>

AC Line Power Supply Requirements

The Agilent FrameScope Pro can operate through the supplied AC adapter between 100V and 240V ± 10%, at a frequency in the range from 50 to 60Hz ± 5%. The maximum power consumption is 30VA.

Line power cable

The type of power cable shipped with each instrument depends on the country of destination.

Australia
8120-1369

Denmark
8120-2956

Europe
8120-1689

Great Britain
8120-1351

South Africa
8120-4211

Switzerland
8120-2104

United States
8120-1378
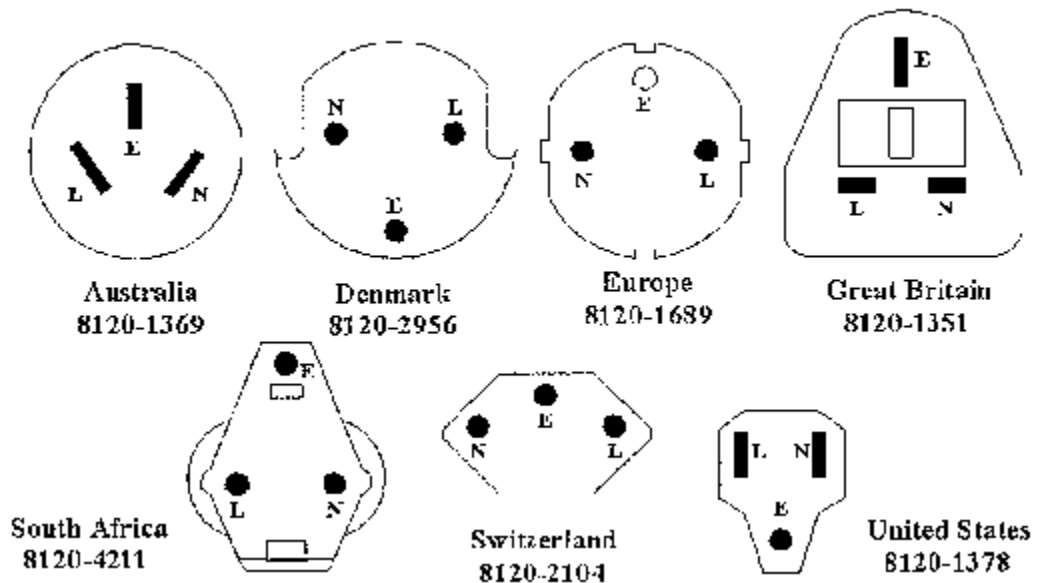
WARNING **To avoid the possibility of injury or death, you must observe the following precautions before switching on the instrument**

1. If the instrument is to be energized via an autotransformer for voltage reduction, ensure that the common terminal connects to the earth pole of the power source.

2. Insert the power cable plugonly into a socket outlet provided with a protective earth contact. Do not negate this protective action by uing of an extension cord without a protective conductor.

DC Power Supply Requirements

Please refer to chapter Specifications.

Battery Requirements

Do not disassemble or attempt to open the battery under any circumstances

The battery can explode, leak or catch fire if heated or exposed to fire or high temperatures.

Do not short circuit the battery by directly connecting metal terminals. Be certain that no metal objects such as coins, paper clips and so on touch the terminals.

Do not drop the battery or subject it to mechanical shock.

NOTE The battery is a consumable part and is not subject to the FrameScope Pro warranty.

Battery disposal

LiIon and NiMH Batteries must be disposed of in a responsible fashion according to the laws in the country where the product is used.

Operating and Storage Environment

Please refer to chapter Specifications.

The FrameScope Pro at a Glance

Front View

RJ 45 WireMap/Auxiliary
Port

Strap Cleat

Touch sensitive
color LCD

Ok Button

Power Button

Compact Flash Memory Slot

Scroll button
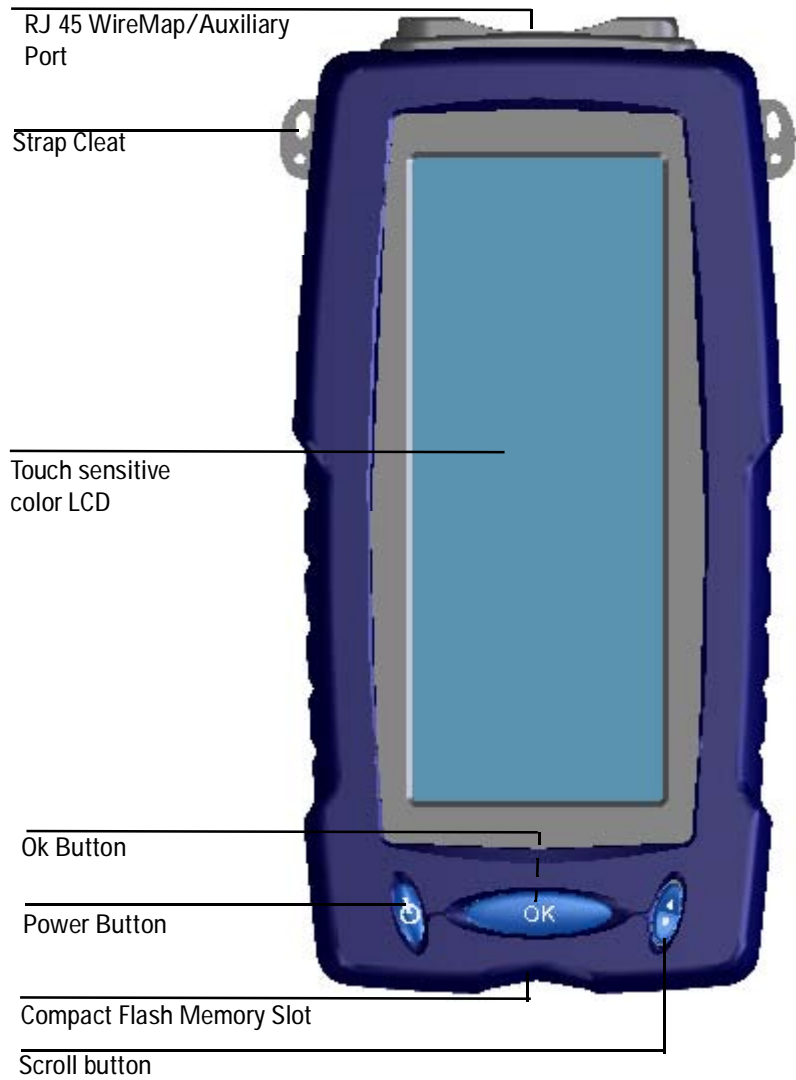
Figure 1   FrameScope Pro Front View

Side Views

Card Bus Slot

Stylus clip

Head set Port

USB (Type A)

USB (Type B)

Battery (Backpack)

Figure 2   Left Side

SFP Port

Ethernet RJ 45 Connector

Flip-out stand (back)

Power Jack
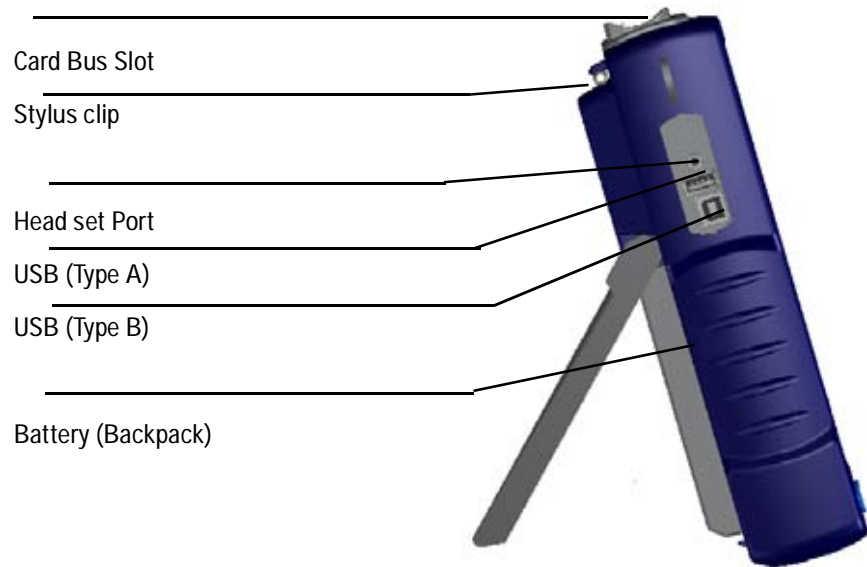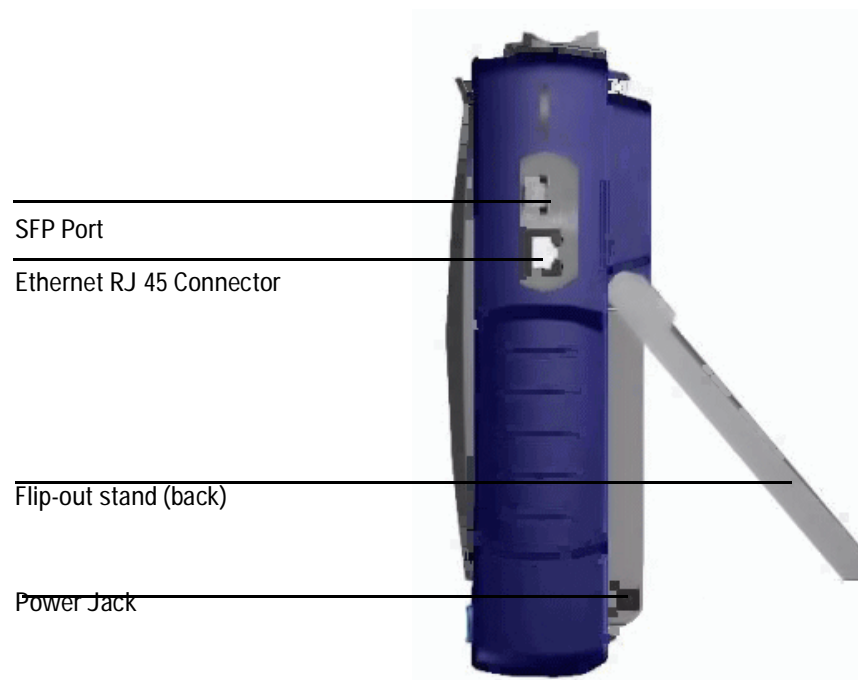
Controls

Color Touch Screen   The FrameScope's touch screen is the main user interface. Test controls and results are shown here. Simply press the screen with your finger or a stylus to navigate through the menus and test controls.

Power Button   Press the **Power** button briefly to switch the unit on. To switch the unit off, do one of the following:

- Press **Power** twice.
- Press **Power** once, wait 5 seconds and the unit powers off.
- Press **Power** once and hit the **Off** button on the screen.

OK Button   Press the **OK** button to activate the currently selected item on the display. Use the OK button to confirm edits, enter values, and execute selected features.

Scroll Button   The scroll rocker button moves the highlight cursor on the screen. Use this button to scroll through selected items on the display.

Ports

CompactFlash™ Slot   This port on the bottom of the unit accepts standard CompactFlash™ cards for data storage.

USB Ports   The FrameScope provides a universal serial bus (USB) interface port to connect with PCs and peripherals. The unit provides a USB Type A port and USB Type B (Hub) port.

Headset Port   This port allows you to connect headset to the FrameScope Pro unit.

DC Power Input   The DC power input accepts the Agilent 12 V DC power adapter/chargers that comes together with your FrameScope.

CAUTION   Use only the 12 V dc adapter/charger (Agilent part #N2620A-080) supplied with your FrameScope Pro . Using an incompatible adapter may violate FrameScope Pro warranty. FrameScope Pro draws varying amount of current depending on battery charge condition,accessories attached and type of test executed. Any inferior adapter may overheat and damage FrameScope Pro, or even injure the user.

The Main Menu at a Glance

Network resources area

Error Flag

Utilization graph

System menu button

Tools menu button

VoIP menu button(optional)

Autotest button
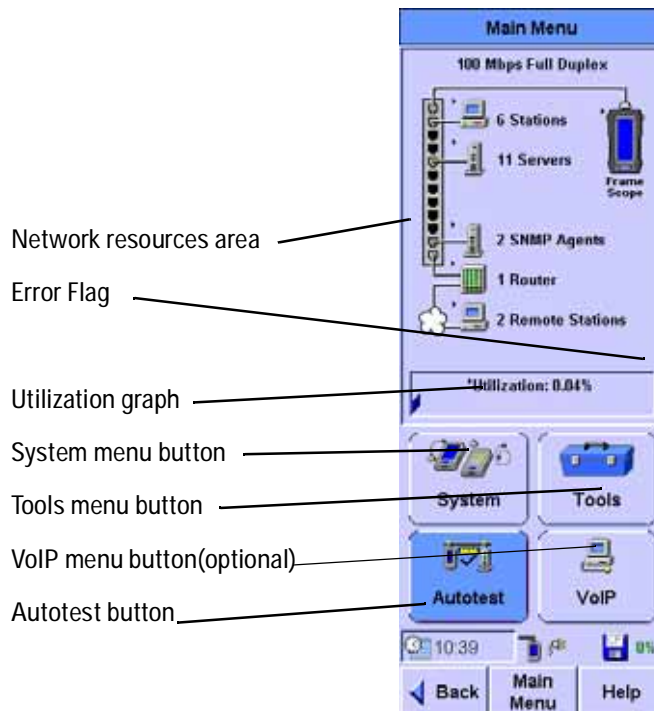
Figure 3   FrameScope Main Menu

Tab Title   Displays the name of the tab.

Network Resource Area   Shows all of the detected network resources. The FrameScope performs auto discovery of network resources. Resource icons shown with a black triangle (see below) can be pressed to display more information.

Press icon to view details
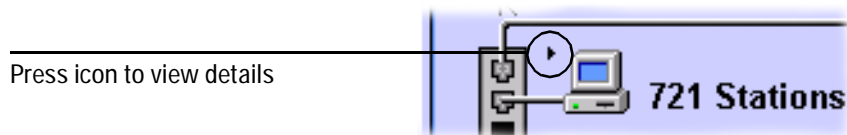
Error Flag   Displayed when an unacknowledged error is in error log

Utilization Graph   Displays current network usage. Press this graph to display more statistics.

System Menu Button   Calls the System menu.

Tools Menu Button   Calls the Tools menu.

VoIP Menu Button(optional)   Calls the Voice Test menu.

Autotest Button   Calls the Network Autotest Setup screen.

Getting Started

Switching the FrameScope On and Off

1   To switch the FrameScope on, briefly press the **Power** button on the front panel.

The screen will light and a brief tone will sound.

2   While the unit is on, briefly pressing the **Power** button will call the Sleep/Shutdown window.
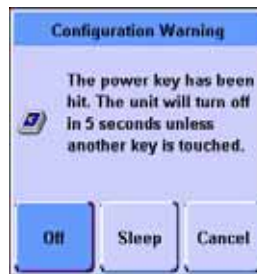
- Press **Sleep** to put the unit in sleep mode. When the FrameScope is in sleep mode, briefly press the **Power** button or press the screen to reactivate it.

- Press **Off** or wait five seconds to turn the unit off.

- Press **Cancel** to go back to the Main Menu.

3   You can also turn the unit off by pressing the **Power** button twice.

Checking Power and Charging the Battery

The FrameScope's battery should provide enough power for a typical day of testing. The AC power adapter/charger can also be used to power the unit and to recharge the battery.

NOTE	To shorten the charging time, Agilent recommends switching off the FrameScope while charging.

To check the battery's charge level, perform these steps:

1 Switch on the FrameScope, if necessary, by pressing the **Power** button on the front of the unit.

2 Observe the battery icon in the Status display area on the Main Menu.

<p align="center">🔋 45%</p>

The battery icon will show how much charge remains in the battery (for example, 45%). If the battery is severely depleted, a low-battery message will be displayed.

WARNING	**Do not operate the FrameScope while the battery is hot immediately after charging.**

When the battery temperature exceeds 55ºC (131ºF), a warning message, for example, "FrameScope too hot", will appear to alert the user.

3 To recharge the battery or to power the FrameScope from an AC power source, plug the DC power connector on the adapter/charger into the 12 V DC connector on the side of the battery

4   Observe that the AC power icon is displayed in the Status area.

<div align="center">

72%

</div>
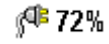
The AC icon will also indicate the battery's charge level (for example 72%).

Connecting to the Network and Using the FrameScope Pro

Follow these steps to connect your unit to the network and use it for testing:

1 Connect the cabling to the FrameScope's network port.If you want to perform testing on fiber link, connect the cable on the SFP port.

2 You operate the FrameScope using its front panel touchscreen and control buttons. When testing with the unit, use the following operating tips:

3 Select items on the display by pressing them with your finger or with a stylus or by scrolling the highlight bar with the scroll button. The touch screen may not detect a quick press; you should press firmly.

4 Many screens have lists of items that you can navigate using the Scroll button. Pressing this button up or down moves the selection highlight.

5 Selected items are highlighted in dark blue to indicate that they are selected. Most screens have a default selected item.

6 Execute a selected item by pressing it or by pressing the **OK** button.

7 To return the Main Menu at any time, press the **Main Menu** button on the bottom of the display.

8 To return to the previous screen, press the **Back** button on the bottom of the display.

Running a Test

The basic steps for performing a test with the FrameScope Pro are described below. For more information on network testing, see Chapter 2, "Network Testing with the FrameScope Pro".

1 Switch the unit on. Connect power to charge the battery if necessary. See "Checking Power and Charging the Battery" on page 20.

2 Connect the FrameScope to the network under test. See "Connecting to the Network and Using the FrameScope Pro" on page 22.

3 Choose the type of test you want by pressing the Autotest, Tools or VoIP Button.

4 Make any needed configuration changes to match your testing environment.

Most basic FrameScope operations execute automatically and require very little setup. In most cases you can skip this step.

5   Press the **Autotest** button or **Start Test** button or **VoIP** button to begin the test.

See "Viewing Details and Statistics" on page 35 for information on reviewing network test results.

Operation

In order to store any test suites or test results on the FrameScope, it is necessary to insert the CompactFlash™ memory card into the CompactFlash™ card slot. The FrameScope will operate without it, but no storage is available.

About Help

The FrameScope Pro comes with a built-in help system, which helps you to operate the unit.

1   Press the Help button on Main menu to get to the main page of the help system.

2   Press the Index button to get all the help available on the FrameScope Pro.

3   From the Index menu, select the topic in which you are interested.

Before you call the technical support hotline, please refer to the online help system.

Software Upgrade

Agilent will continue to upgrade the FrameScope Pro's software to meet your needs. You may obtain the latest software release from our website:

<div align="center">http://www.framescope.com</div>

Use FrameScope Pro Software Upgrade Utility to download the software into FrameScope Pro. For details about this utility please refer to the FrameScope Pro Software Upgrade Utility Manual.

Caution: Do not interrupt the downloading process. Any interruption may cause corrupted software, and require repair at the Customer Service Center. To avoid power loss due to a low battery, the unit should be plugged into AC power during the upgrade.

Localization

The unit may be shipped with the local language already installed.
Software versions exist on the Utilities CD supplied which provide for the following languages for the FrameScope:

English

Korean

French

German

Chinese (simplified)

Italian

Spanish

Japanese

To install a language version other than English, use the FrameScope Pro Software Upgrade Utility to upgrade the FrameScope to the language desired, or using a USB cable.

2

Network Testing with the FrameScope Pro

This chapter describes how to use your Agilent FrameScope Pro as a network performance analyzer.

The FrameScope network testing features allow you to create a list of key network resources and evaluate their performance. Active discovery and detailed metrics allow you to troubleshoot problems and pinpoint network bottlenecks.

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Network Testing Overview

The following steps describe the general procedure for performing network analysis testing using the FrameScope Pro.

1 Power the unit on. See "Switching the FrameScope On and Off" on page 19.

2 Connect to the network under test. See "Connecting to the Network and Using the FrameScope Pro" on page 22.

The FrameScope automatically begins to poll the network and locate devices. See "Examining the Network" on page 27.

3 View details about the detected network resources. See "Detailed List" on page 28.

4 Perform an Autotest on any or all desired resources. See "Running an Autotest" on page 29.

5 Select any devices on the network and perform additional testing, such as:

- Ping test; see page 38.
- Trace Route test; see page 41.
- SNMP Queries; see page 44.

6 Save results as desired, perform other tests or functions.

Examining the Network

Network Overview

FrameScope will start discovery process on the network as soon as it is switched ON.

The Network resources area of the display will show a list of detected network devices.

Detailed List

1   To view a detailed list of network resources, press on any category in the Network Resources area. A triangle indicates that a list is available for that category.

Press icon to view details

2   Use the Scroll button to select items in the list. The **Collapse List** and **Expand List** button is renamed **View** when the highlight is on a particular station. Press the **View** button to see details of the selected item. A red '**X**' means that the device wasn't present the last time it was checked.

3   Press **Back** to return to the Network tab, or press **Main Menu** to return to the beginning screen.

Running an Autotest

This section describes how to run an Autotest on the network using the FrameScope Pro. The FrameScope can store Autotest *suites* that define which network elements to test.

1 From the Network Overview screen (see page 27) press the **Autotest** button. The Network Autotest Setup screen is displayed.

2 If you want to save this Autotest suite, or load a previously-stored suite, press the **Suite** button.

3 Select a stored suite from the list or select **Create New**, then press the **Next** button. You can select **<Default>** if you want to reload the default suite.

4 If you **Create New**, you will be prompted to enter a new name.

a On the Network Autotest Setup window, press the **Iterations** button to select how many times the test is to be run.

b Enter the number of times you want the test to run in the number entry box.

c Enter the time in minutes to wait between tests in the Interval text box.

d When you have finished press **OK**.

5 On the Network Autotest Setup screen, use the **Delete** and **Add** buttons to remove or insert elements from the resources list. You can also use the **Add** button to enter new network resources.

6 To change an item on the resources list, select the item and press the **Edit** button. You will be able to enter new details for that network resource.

For more details, see "Network Performance Autotest" on page 129.

7 When you have finished setting up the test, press the **Start Test** button (or press **OK**) on the Network Autotest Setup screen. The test will begin.

8 To stop the test at any time press the **Stop Test** button.

9 To view information about a network element's results, select the element from the list and press the **Details** button.

10 Press the **Save Results** button to store the test data on the CompactFlash™ card.

The rating numbers will range from 5 to 1, where 5 is best and 1 is worst. A red 'X' will be displayed if an error occurred during the test. See the next section for how to change the metrics used to derive the ratings.
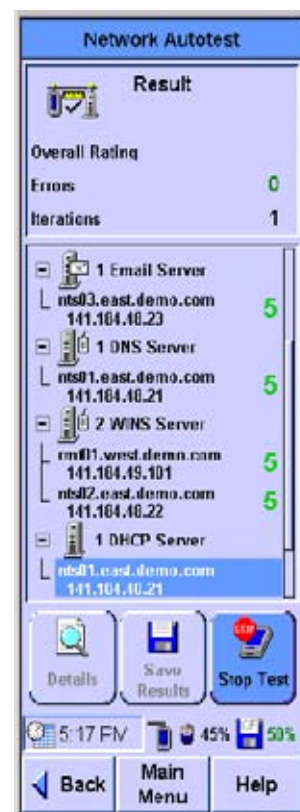
Changing the Autotest Metrics

The FrameScope Pro provides a measure of service speed and efficiency by emulating a client device in the network. By making a request for service to a key device, and comparing the results to reasonable expectations, it provides a rating of the service. However, the default numbers used to determine the rating may not apply to the network under test.

For example, you may know that the connection to the available domain name server is over a slow link and this link cannot be upgraded.

Consequently, it may be more important to have a test that is less sensitive but provides meaningful results that can be compared over time. The FrameScope Pro rating can be changed. After you've run the test and received a result, such as that shown below on the left, you can highlight the server address and press **Details**. The screen shown in the middle provides the measured results of the test. If you double click on Name Lookup, you can change the rating scale to whatever values you choose. The screen on which you do that is shown below on the right. This can be done for all rated measurements. See Chapter 5, "Network Performance Analyzer Reference".

Using the Stations List

When a network resource on the Network tab is shown with a black triangle, you can press the resource to display the Network Database screen, which includes the Stations List.

1   On the Network tab, press the resource you wish to view.

Press here to view details

Stations List
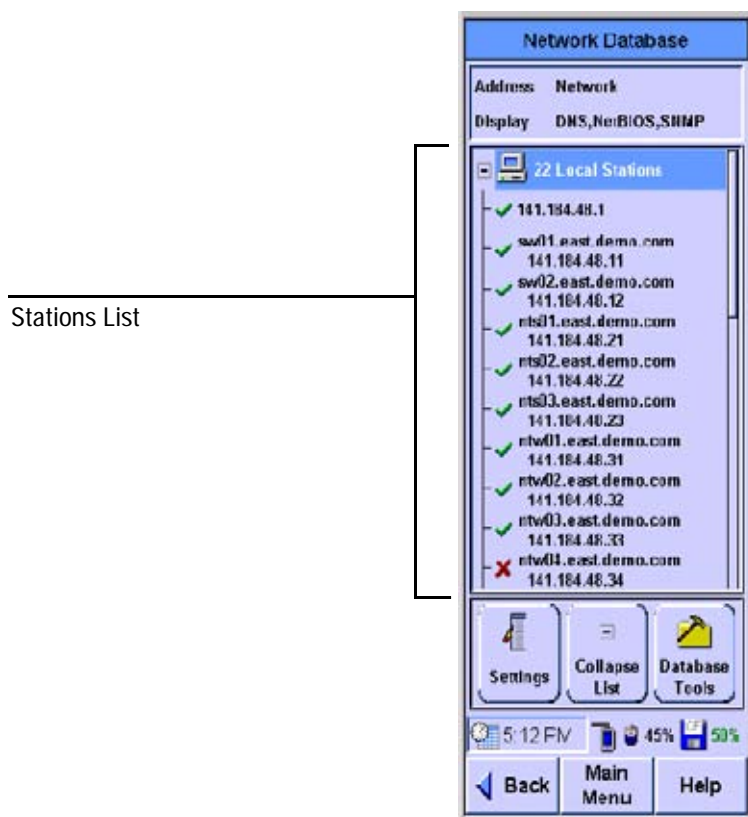
2   Use the Scroll button to navigate through the items on the Station List.

3   Expand or collapse the Station List by selecting a category and then pressing the **Expand** (or **Collapse**) button.

NOTE	The Collapse List, Expand List, and View buttons all appear in the same place on the screen, depending on the currently selected item in the Station List. See also "Viewing Details and Statistics" on page 35.

4 You can use the **Settings** button to reorder the Station List and select what information is displayed.

5 You can use the **Database Tools** button to update, erase, load or save the Stations List or delete a resource from the Stations List.

Viewing Details and Statistics

1 Select a station on the Station List and then press the **View** button.

2   Press the **Statistics** button to view statistics about the station.

3 On the Station Detail screen,
press **Tools** to see a list of test
tools that can be used on the
selected station. These tools are
describe in more detail in the
following sections.

NOTE	The tools that are displayed on the Station Tools list will vary depending on what type of station you are viewing. Not all tools are available for every type of station.
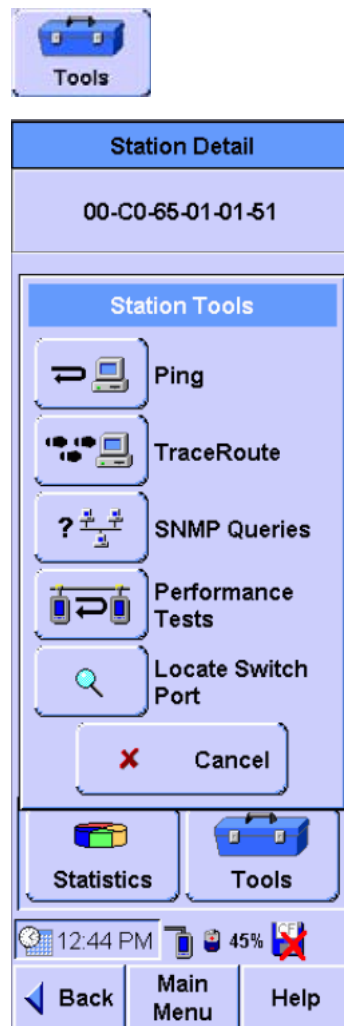
Performing a Ping Test

The Ping test allows you to check if communications can be established with a particular remote node. The FrameScope "pings" a remote node by sending it a request message. If the remote device is active and reachable it will respond.

Follow these steps to run a Ping test.

1 From the main Network tab or from a device's display on the Station List, press the **Tools** button to display a menu of available network testing tools.
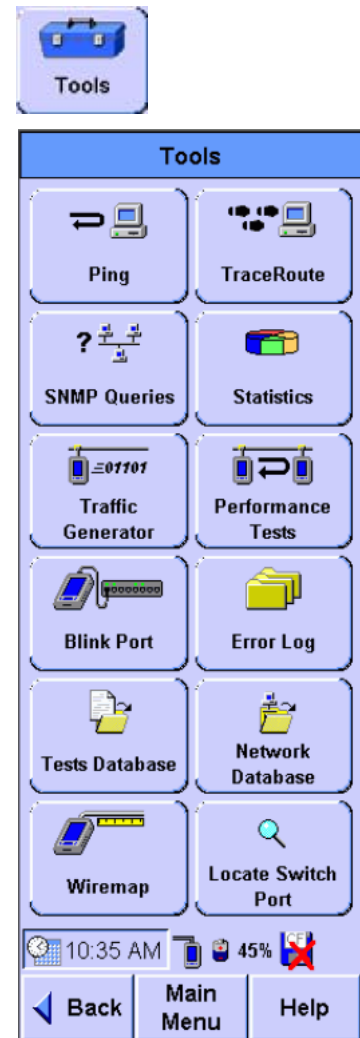
2   Press the **Ping** button to call the
    Ping screen.

3   Enter the device you want to ping in
    the Target box. You can enter the
    device name or address.

4   Select the ping options you want,
    selecting IP or IPX, length of the
    ping, and the number of iterations.

5   Enter the Time To Live and whether
    you want fragmentation in the IP
    Options area. Or if you selected IPX
    above, select the IPX request type:
    Diagnostic or PING.

6 Press the **Start** button to begin the ping test.
The Ping Results screen will be displayed.

7 Observe the results of the Ping test.

The screen will show the frame length you selected, the number of requests (pings) sent and the number of replies received. Data on the response times are also displayed.

8 To run the test again press the **Start** button.

Ping	
⇄ 🖳	141.184.048.001

Frame Length	64
Requests	10
Replies	10
Errors	0
Response Times	
Current	0.002741 s
Average	0.003609 s
Maximum	0.004757 s
Minimum	0.002644 s

Start

4:27 PM 45%

◀ Back | Main Menu | Help

Performing a Trace Route

The Trace Route test allows you to determine the path through the network to a particular device. The FrameScope sends data packets over the network and returns the routers on the path and the time it took for each hop.

The following procedure describes how to run a Trace Route test.

1 From the main Network tab or from a device's display on the Station List, press the **Tools** button to display a menu of available network testing tools.

2 Press the **TraceRoute** button to call the TraceRoute screen.

3 Enter the device to which you want to trace in the Target box. You can enter the device name or address.

4 Select the maximum number of hops to be reported.

5 Press the **Start** button to begin the TraceRoute test.
The TraceRoute Results screen will be displayed.

6 Observe the results of the TraceRoute test.

The screen will show the number and address of each hop. In addition the delay (in seconds) to each hop is shown. The delay is cumulative, but since each termination is measured individually, an anomaly may exist where an intermediate time is greater than a subsequent time due to network performance.

7 To run the test again press the **Start** button.

Performing SNMP Queries

The simple network management protocol (SNMP) query tool allows you to send a query to the management information database (MIB) and retrieve the available information for that host.

The following procedure describes how to run an SNMP Query using the FrameScope Pro

1 From the main Network tab or from a device's display on the Station List, press the **Tools** button to display a menu of available network testing tools.
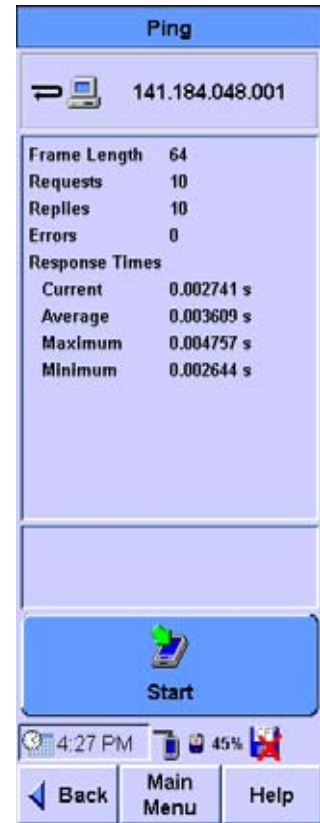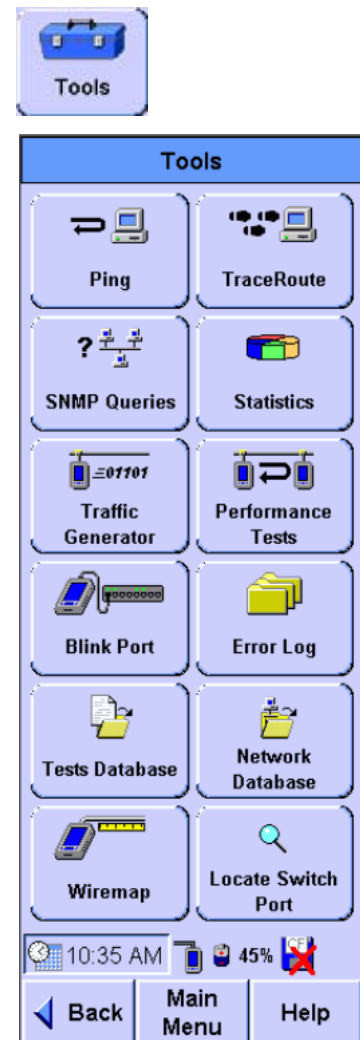
2 Press the **SNMP Queries** button to call the SNMP Query screen.

3 Enter the device to which you want to query in the Target box. You can enter the device name or address.

4 The **SNMP Settings** button allows you to add SNMP communities and ports to the default "public" community and default port 161 or to change those set up for auto discovery.

5 Press the **Start** button to begin the SNMP Query test.
The SNMP Queries Results screen will be displayed.

6 Observe the returned information on the SNMP Queries results screen.

The screen will show the description, ID, and other information as returned by the remote host.

7 To run the test again press the **Start** button.

Viewing Statistics

You can use the FrameScope to view a variety network parameters, and see performance statistics for them. The following procedure describes how to use the FrameScope's Statistics tool.

1   Press the **Tools** button on the main Network tab to display the Tools menu or use the shortcut from the Network Main Menu by pressing the Utilization bar
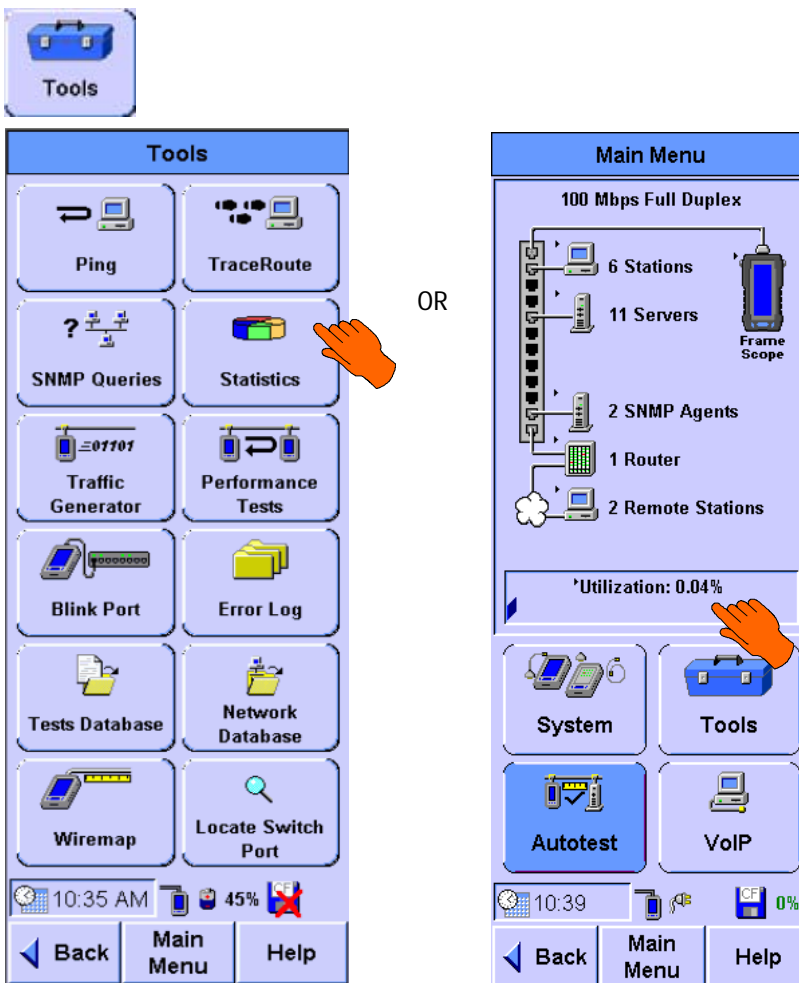
2 Press the **Statistics** button to call the Statistics screen.

Press this to view or change the Statistics settings.

Press this to view the list of saved data or to delete saved data.

The screen shows network utilization and other traffic data such as frame counters, and protocol counters.

3 To view additional details, press any item shown with a black triangle.

- Press **Unicasts**, **Broadcasts**, or **Multicasts** to view the top talkers for that frame type.

- Press **Errors** to view a breakdown of the types of errors detected on the network.

4 Press the **Settings** button on the Statistics screen to switch between counts and percentages, protocols and frames.
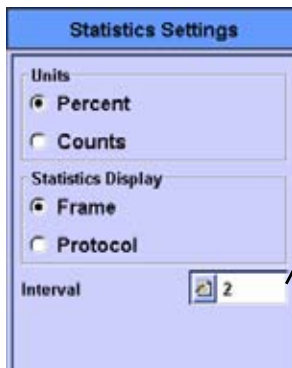
Set the **Interval** between 2 to 1080 seconds. The graphs display statistics of data captured within this time interval and refreshes every interval time.

5   Press **Utilization** on the Statistics screen to view the top talkers (most active devices) on the network.
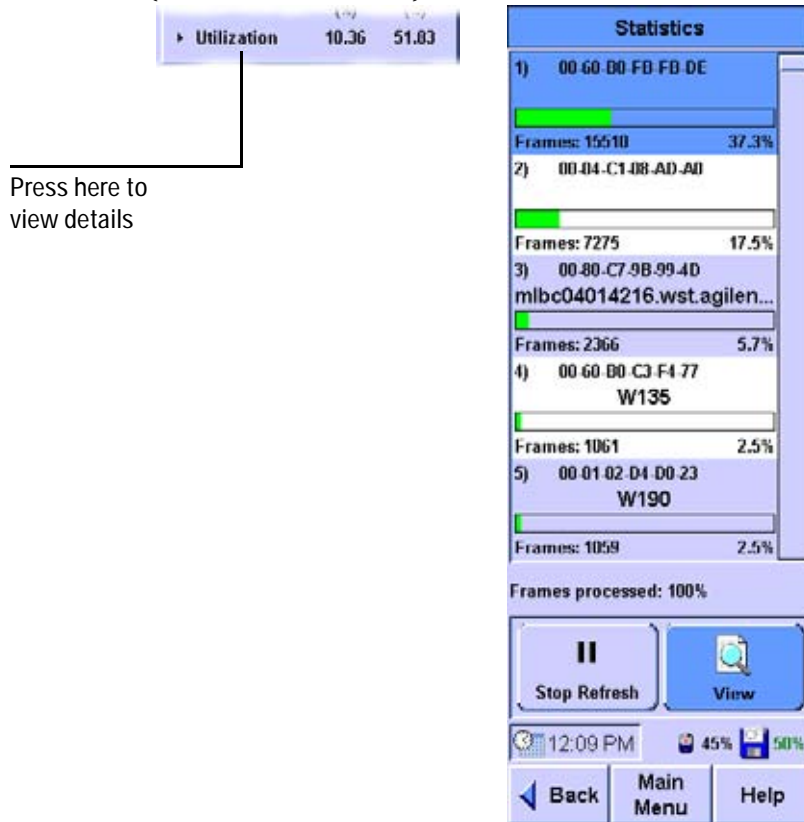
Press here to view details

Saving and Retrieving Statistics Data

The Statistics Data can be saved on the main page of the statistics function. You can view a list of statistics data saved by clicking on the Database button.

To retrieve the saved data tables, you can either access the CF card using a card reader or via the FrameScope Pro configured as a web server. (Please refer to "Remote Control" on page 114).

Generating Network Traffic

You can use the FrameScope's **Traffic Generator** to create network traffic to stress the network and observe how is reacts under different loads.

The following procedure describes how to use the **Traffic Generator**.

1 Press the **Tools** button on the main Network tab to display the Tools menu.
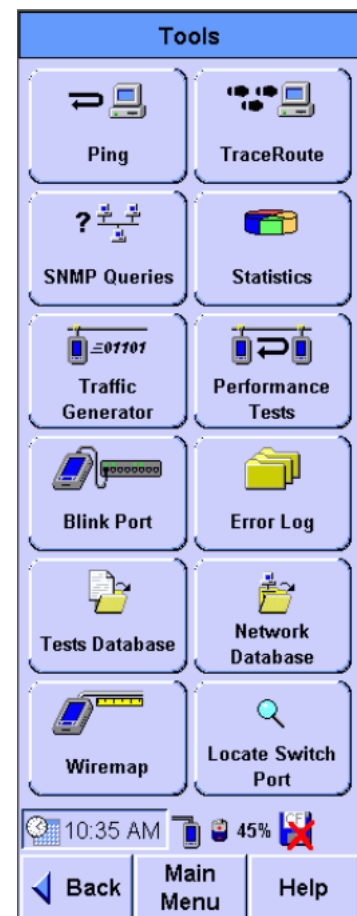
2 Press the **Traffic Generator** button. The Traffic Generator screen will be displayed. To add security to the use of the traffic generator, since it may disrupt your network, you may configure a password to prevent someone without the password from using the traffic generator.

3 On the Parameters tab, configure the traffic characteristics as you desire. Press each parameter (**Frame Length**, **Frame Rate**, and so on) and enter the value you want in the on-screen keypad. See "Traffic Generation" on page 158.

4 To inject errors in the generated traffic, press the check box for the type of error you want (CRC, short frame, or long frame). See "Traffic Generation" on page 158.

5 To configure the frame characteristics of the traffic, press the **Frame** tab.

6 Press the box buttons to enter the Frame Type, MAC source, and MAC Destination. See "Traffic Generation" on page 158. Note that if you select an IP type frame, you will get additional selections for IP Source and IP Destination.
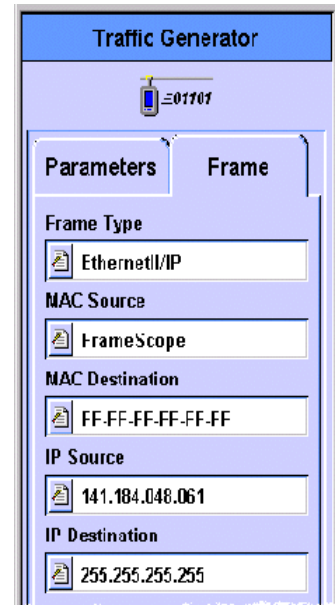
7 Press the **Start** button to begin generating traffic. The Traffic Generator activity screen is displayed.

8 Observe the traffic statistics. For more information on the results, see "Traffic Generation" on page 158.

9 If you want to change traffic parameters press the **Back** key to return to the Parameters and Frame tabs. To restart the test press **Start**.
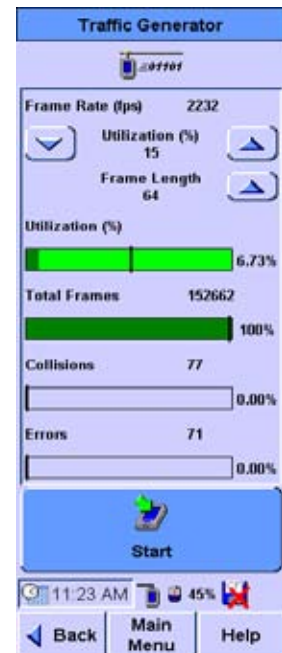
Performance Tests

Performance tests comprise of RFC 2544 tests and IP or MAC Loopback tests. These tests are used to verify the performance of network between two network points. Using this performance tests tool, you can perform the following:

- MAC or IP Loopback Test — go to "Performing a MAC or IP Loopback" on page 55.

- RFC 2544 Throughput Test — go to "RFC 2544 Throughput Test" on page 57.

- RFC 2544 Round-trip Latency Test — go to "RFC 2544 Round-trip Latency Test" on page 57.

- RFC 2544 Frame Loss Rate Test - go to ""RFC 2544 Frame Loss Rate Test" on page 58

- RFC 2544 Back To Back Test - go to "RFC 2544 Back to Back Test" on page 58

| NOTE | All performance tests require two FrameScope or a loopback device (for RFC 2544 test only); one at each end of the network circuit to be tested. |

General settings for the master FrameScope

To start off any performance test, follow the steps below:

1 Connect two FrameScope or a FrameScope with loopback device (for RFC 2544 test only) to the network. Connect one at each end of the network circuit you want to test. See "Connecting to the Network and Using the FrameScope Pro" on page 22.

2 On the master FrameScope, press the **Tools** button on the main Network tab.
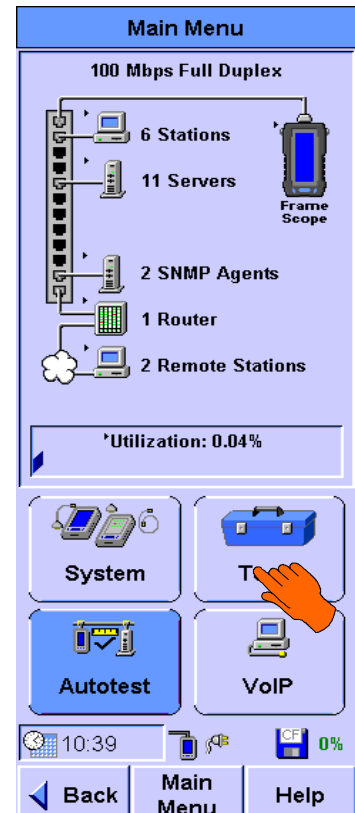
3 Press **Performance Tests** button on the Tools menu.
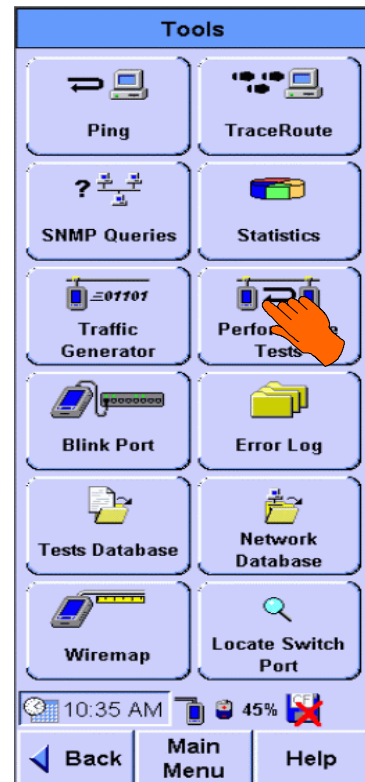
Performing a MAC or IP Loopback

| NOTE |
The MAC loopback test only works within the subnet (does not work across routers).

The master or target FrameScope sends periodic MAC-level or IP-level messages to the slave FrameScope with user-defined periodic interval. The slave FrameScope echoes back each of these messages. The FrameScope will record the number of transmitted, received and error frames, the current, average, minimum and maximum delays of frames.

To perform the tests, see the following steps:

1 From the Performance Tests menu, select **MAC Loopback** or **IP Loopback**

2 There are two options to search for the slave FrameScope:

Option 1: If you do not know the MAC or IP address/name of the slave FrameScope, select **Search for FrameScope**.

Option 2: For MAC Loopback, un check the **Search for FrameScope** check box and enter the MAC address of the slave FrameScope. For IP Loopback, enter the IP address or name of the slave FrameScope.

Performance Tests

RFC 2544 Test

IP Loopback

MAC Loopback

3 In the MAC or IP Loopback menu, press **Start** or press the **OK** button to begin the test.

The FrameScope will search the other FrameScope (which will be acting as slave) on the network and then report back the link results.
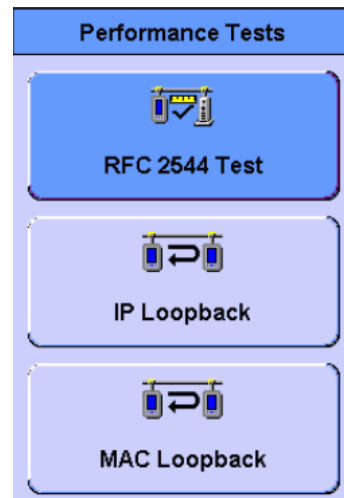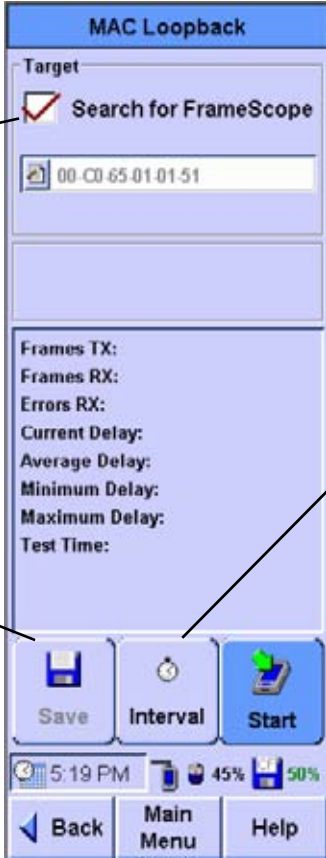
MAC Loopback

Target

Search for FrameScope

00-C0-65-01-01-51

Option 1: Select **Search for FrameScope** to automatically locate the slave FrameScope within the subnet.

Option 2: Un Check **Search for FrameScope** and enter the MAC address of the slave FrameScope.

Press **Save** to save current test results.

Frames TX:
Frames RX:
Errors RX:
Current Delay:
Average Delay:
Minimum Delay:
Maximum Delay:
Test Time:

Save Interval Start

5:19 PM 45% 50%

Back Main Menu Help

MAC Loopback

Target

Search for FrameScope

00-08-02-C1-11-43

00-08-02-C1-11-43

Search results displays the MAC address and current MAC loopback test results.

Press **Interval** to enter time (in seconds) between the start time of a transmitted frame to the start time of next transmitted frame from the master FrameScope.

Frames TX: 2
Frames RX: 2
Errors RX: 0
Current Delay: 5.163960 Sec
Average Delay: 5.163960 Sec
Minimum Delay: 5.163960 Sec
Maximum Delay: 5.163960 Sec
Test Time: 00:00:02

Save Interval Stop

5:17 PM 45% 50%

Back Main Menu Help

IP Loopback

Target

Search for FrameScope

141.183.30.209

Name   Address

141.183.30.209

Option 1: Use auto search to locate the slave FrameScope within the subnet.

Option 2: Key in the name or IP address of slave FrameScope.

Frames TX: 4
Frames RX: 4
Errors RX: 0
Current Delay: 5.163960 Sec
Average Delay: 5.163960 Sec
Minimum Delay: 5.163960 Sec
Maximum Delay: 5.163960 Sec
Test Time: 00:00:04

Save Interval Start

5:16 PM 45% 50%

Back Main Menu Help

IP Loopback

Target

Search for FrameScope

far01.demo.com

Name   Address

far01.demo.com
141.185.50.101

Frames TX: 7
Frames RX: 7
Errors RX: 0
Current Delay: 0.000046 Sec
Average Delay: 0.000035 Sec
Minimum Delay: 0.000004 Sec
Maximum Delay: 0.000062 Sec
Test Time: 00:00:07

Save Interval Stop

10:31 AM 45%

Back Main Menu Help

MAC Loopback

IP Loopback

4   Press **Stop** to cancel the test or to review the transmission information on the MAC Loopback or IP Loopback screen.

Performing RFC 2544 Tests

RFC 2544 tests comprise of round-trip latency test, point-to-point throughput test, frame loss rate tests and back to back tests.

| NOTE | For RFC 2544 tests, if the slave FrameScope unit is in use, for example, running a frame loss rate or back to back test, an auto-search from the master FrameScope unit will result in **Search Failed**. A specific search (keying in the IP address) on a FrameScope unit under test will result in **Remote Busy**. |

RFC 2544 Throughput Test

This test is designed to determine the maximum throughput rate in frames per second, bits per second or percentages for different frame length between two network points with no frame loss.

The test sends frames at a constant rate in unidirectional or bi-directional, for a specified number of seconds. If the transmitted frame count does not match the number of frames received by the other side, the transmit level is reduced. A search is conducted to determine the maximum frame rate that can be forwarded by the network with no loss. The search is capped by the maximum data rate if it is specified by user, otherwise will be based on the media maximum rate. During Bi-directional symmetrical test or loopback mode if the frame is dropped, regardless of the direction the test will be re-run at a lower rate and the final result will be single throughput value.On the otherhand, bi- directional asymmetrical test will measure the throughput rate for each direction. The test procedure is repeated for a number of legal frame length to produce a table of maximum throughput versus frame length.

For better results, adjust the duration to load the device under test sufficiently.

RFC 2544 Round-trip Latency Test

This test measures the latency experienced by a frame passing and looping back through the network. A specially tagged frame is sent and the time that this frame exits and loopbacks to the FrameScope is recorded. Round trip latency is the difference

between the entrance and exit times of the tagged frame. The reported latency is an average of at least 20 trials. The test is conducted over a range of frame sizes.

For better results, adjust the duration to load the device under test sufficiently.

RFC 2544 Frame Loss Rate Test

This test measures the percentage of frames that are not forwarded by network devices due to lack of resources for entire range of frame length and data rates.

For a specific frame length, traffic is sent at the maximum rate (100% load). The number of frames received is compared against the number of frames transmitted and shown as a percentage of frames forwarded by the network. The data rate is reduced by step size of 10% (configurable) until two successive measurements, without single frame loss or till 10% traffic level(lowest step size) is reached.

The test is conducted over a range of frame lengths. The test can be performed either in loopback or unidirectional or bi-directional mode. Loopback mode is similar to bi-directional test, the only difference is the destination is a loopback device instead of another FrameScope.

For better results, adjust the duration to load the device under test sufficiently.

RFC 2544 Back to Back Test

This test measures the maximum number of back to back frames that the network can transfer without loss.

For a specific frame length, a burst of back to back frames is sent to a destination device through the network. Similar to the throughput test, a binary search of burst sizes is done to find the maximum burst size that can be forwarded by the network with no loss of frames. The trial length must be at least 2 seconds and the results of at least 50 trials should be averaged for the displayed value. The test is conducted over a range of frame lengths.

The test can be performed either in loopback or unidirectional or bi-directional mode. Loopback mode is similar to bi-directional test, the only difference is the destination is a loopback device instead of another FrameScope.

For better results, adjust the duration to load the device under test sufficiently.

Setting the network for RFC 2544 Tests

You may also have to adjust the network settings to ensure the test can run. In particular:

• NAT has to be disabled or should allow the IP and MAC addresses of the FrameScope™ Pro to pass through.

• Firewalls have to be disabled or should allow the IP and MAC addresses of the FrameScope™ Pro to pass through.

• ICMP ports need to be freed up for the network under test (for information request and reply).

• UDP ports 7 (slave UDP port) and 7777 (master UDP port) needs to be freed up for the network under test.

• During RFC2544 Test, the FrameScope Pro has a default timeout duration after a MAC reset. If the peer does not respond within the stipulated time, the RFC 2544 test will not start and will result timeout. Different switches may have different response time after a MAC reset. Users should select a suitable and appropriate timeout period for the switches under test with advise from their equipment supplier or vendor.

Setting the master FrameScope for RFC 2544 Tests

To perform a RFC 2544 test, you will need two FrameScope or FrameScope and loopback device, one as master and the other as slave. For initial settings on the master unit, see "General settings for the master FrameScope" on page 53 and then continue with the steps below:

1 If the destination is a FrameScope, ensure that the slave FrameScope is ready for RFC 2544 test. For slave FrameScope settings, go to "Setting the slave FrameScope for RFC 2544 Tests" on page 65.

2   From the Performance Tests menu, select **RFC 2544 Test.**

3   Select **Throughput**, **Frame loss rate**, **back-to-back** and/or **Latency** RFC 2544 test options.
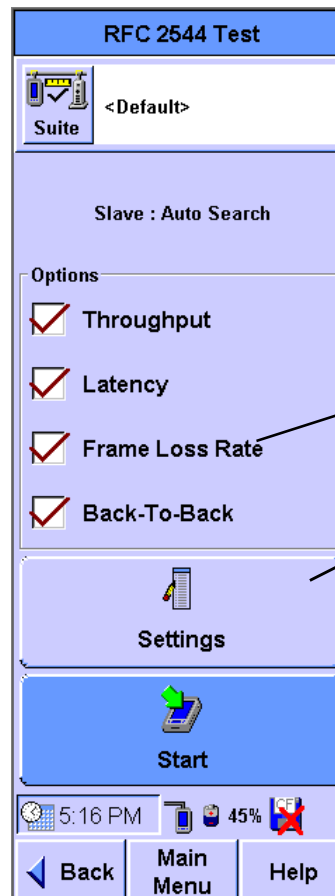
Press **Suite** to load or create new test suite.

Select RFC 2544 test options.

To set specific RFC test parameters, press **Settings**.

4 Optional: If you want to save this RFC 2544 Test suite, or retrieve a previously stored suite, press the **Suite** button.
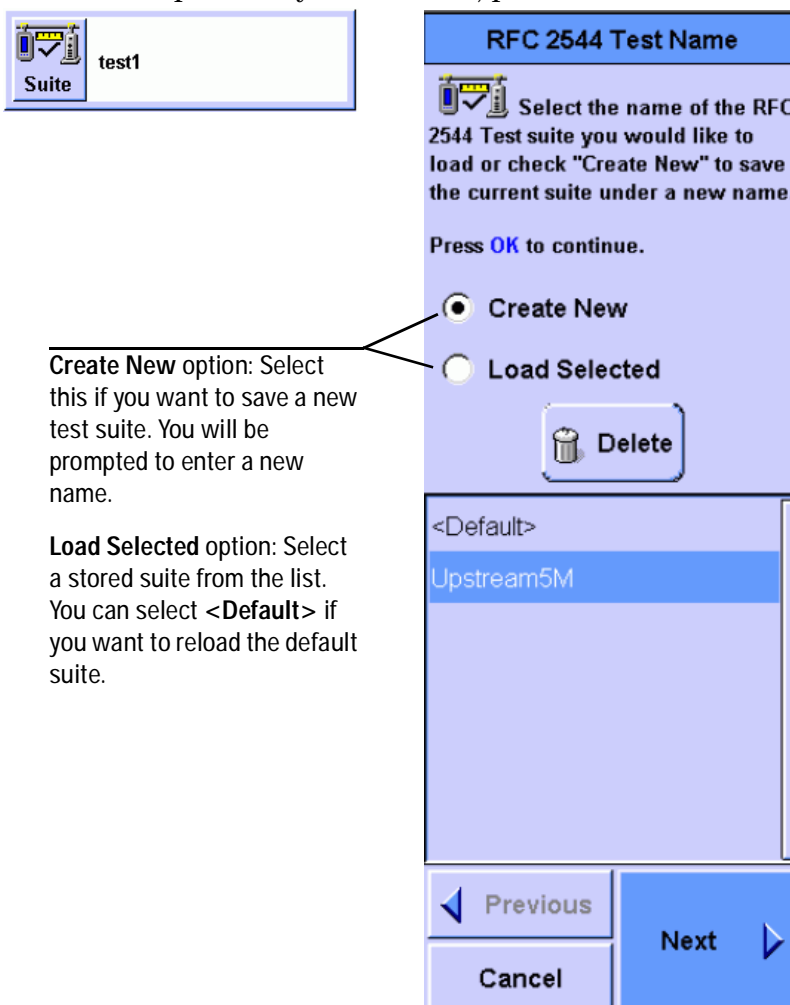
Create New option: Select this if you want to save a new test suite. You will be prompted to enter a new name.

Load Selected option: Select a stored suite from the list. You can select **<Default>** if you want to reload the default suite.

5 The initial setting screen is common for all the RFC testing, which allows user to enter destination device and password. The screen is shown below "Slave Setup" on page 62.In the RFC 2544 Test menu, the remote test device can be either another FrameScope or any loopback device. If loopback device is selected, user has two options:

Option 1: User can select IP layer loopback device, where he needs to specify the IP address or name of the device.

Option 2: User can select MAC layer loopback device,where mac address of the device needs to be entered.

Similarly for slave FrameScope also there are two options:

Option 1: If you do not know the IP address/name of the slave FrameScope, select **Search for FrameScope**.

Option 2: If you know the IP address/name, enter the corresponding IP address/name.

6 For specific Throughput, Latency, Frame loss rate, Back-to-Back test settings, press **Next**. For details on specific parameters, go to corresponding sections on "The Throughput Settings screen." on page 63 "The Latency Settings screen." on page 63, "Frame loss rate settings screen" on page 64, "Back to Back settings screen" on page 64 respectively.

Slave
Setup

Or

Select FrameScope or Loopback for the test

IP Address (or name) of FrameScope or MAC address of the Loopback, depending on the selection

Password Entry

Timeout

The Throughput Settings screen.

Settings

Select the frame direction to measure.(if destination is loopback only bidirectional options is present)

Max Data Rate is used for initial frame speed and performance calculation. Enter the maximum data rate of the network under test. If not known, the link speed will be used.

Specify the frame length (minimum of 64 bytes to maximum of 1518 bytes) or select full range to collect all frames of lengths 64, 128, 256, 512, 768, 1024, 1280, and 1518).

Throughput Setup

Select direction and options.

Direction
- Upstream
- Downstream
- Bi-Directional
  - Sym
  - Asym

Frame Rate (fps)
- Full Range
- Single

Upstream   1024

Downstream   1024

Options

(Link Speed : 10 Mbps)

Max Data Rate   10.000

Length   64   Full Range

Duration   10

◀ **Previous**

✓   **OK**

Select to measure full range or specify the upstream and downstream rates.

Network connection speed

Duration is the time taken (in seconds) to transmit frames that could be of different length, at different rates.

For better results, adjust the duration to load the device under test sufficiently.

The Latency Settings screen.

Settings

The Latency test automatically uses values set for the Throughput test.

If a frame length is set for the throughput test, this cannot be changed for the latency test.

Latency Setup

Latency

Length   64   Full Range

Iterations   20

Duration   5

Upstream Util (%)   0

Downstream Util (%)   0

Specify the frame length or select full range to collect all frame lengths.

Specify the number of round-trips for the test.

For better results, adjust the duration to load the device under test sufficiently.

Specify the upstream and downstream utilization rates when performing the Latency test.

Frame loss rate settings
screen

Frame Loss Rate Setup

Select direction and enter frame rate, frame length, max data rate, test duration and step size.

Direction
- ◉ Upstream
- ○ Downstream
- ○ Bi-Directional

Frame Rate (fps)
- ◉ Full Range
- ○ Single
  - Step Size (%) 📄 10
  - Frame Rate 📄 1024

Options
(Link Speed : 10 Mbps)

Max Data Rate 📄 10.000

Length ○ 📄 64
  ◉ Full Range

Duration 📄 10

◀ Previous

Select the frame direction to measure.(for loopback only bi direction is present)

Max Data Rate is used for initial frame speed and performance calculation. Enter the maximum data rate of the network under test. If not known, the link speed will be used.

Select full range to measure frame loss rate specified by step size or specific rate

Specify the frame length or select full range to collect all frames.

Duration is the time taken (in seconds) to transmit frames

For better results, adjust the duration to load the device under test sufficiently.

Back to Back
settings screen

Back-To-Back Setup

Select direction and enter max data rate, frame length, burst duration and iteration.

Direction
- ◉ Upstream
- ○ Downstream
- ○ Bi-Directional

Options
(Link Speed : 10 Mbps)

Max Data Rate 📄 10.000

Length ○ 📄 64
  ◉ Full Range

Iterations 📄 50

Duration 📄 2

Select the frame direction to measure.(for loopback only bidirectional is present)

Specify the frame length or select full range to collect all frames.

Duration is the time taken (in seconds) to transmit burst frames

For better results, adjust the duration to load the device under test sufficiently.

7 If a password is preset in the slave FrameScope, press the **Slave Password** button on the master FrameScope to enter the

password. You will get a warning, "Permission Denied", if a password is set in the slave FrameScope and not entered correctly in the master FrameScope.

8 Press **Start** to begin test.

After pressing the Start button, the master FrameScope starts the activation and synchronization procedures with the target FrameScope by doing the following actions:

9 Search (if enabled) and check status of the slave FrameScope

10 Activate the slave FrameScope if in idle mode

11 Authenticate the master FrameScope if the password is enabled

12 Set up the slave FrameScope parameters by synchronizing the master and slave FrameScope for the test

13 Start test

14 Query test results at end of test

15 Stop test

If the target selected is loopback device, all the test setup is done in the master device. There will be no authentication synchronization setup.

Setting the slave FrameScope for RFC 2544 Tests

1 From the Network main menu, press **System**.

2 From the System Settings Network menu, press **RFC 2544 Test**.

3 Select the **Enable RFC 2544 Test** option. You may set a password in the slave FrameScope to enable the master FrameScope login. Press **OK**.

The slave FrameScope is now ready to perform RFC 2544 tests. Do not run other tests on the slave FrameScope while RFC 2544 tests are in progress.

RFC 2544 Test Mode

  RFC 2544 Test is in
progress. This is a slave device for
network RFC 2544 Test between two
FrameScopes.

Hitting Stop, Back, Main Menu or
Help will stop the test.

If no traffic is detected within 5
seconds, RFC 2544 Test will stop
automatically.

Master IP Address

141.183.30.84

Throughput

Testing In Progress

Stop

10:54 AM   45%   50%

Back   Main Menu   Help

These are the
screens of the slave
FrameScope when
throughput (left)
and latency (right)
RFC 2544 tests are
running.

RFC 2544 Test Mode

  RFC 2544 Test is in
progress. This is a slave device for
network RFC 2544 Test between two
FrameScopes.

Hitting Stop, Back, Main Menu or
Help will stop the test.

If no traffic is detected within 5
seconds, RFC 2544 Test will stop
automatically.

Master IP Address

141.183.30.84

Latency

Testing In Progress

Stop

10:54 AM   45%   50%

Back   Main Menu   Help

RFC 2544 Test Results

For full range frame length and frame rate throughput RFC 2544
tests, a graph can be plotted to display the RFC 2544 test
results. The graph helps analysis of performance between two
points in the network quickly and efficiently. These results can
then be saved to the compact flash card for further analysis.

Throughput

141.184.48.51

Test Time:	00:00:11
Frame Length:	64 Bytes
Upstream	
Program Rate:	14881 fps
Actual Rate:	14881 fps
Frames TX:	148810
Frames RX:	148810
Errors RX:	0

Plots   Save Results   Stop Test

The IP address of the FrameScope. If the name exists, it will be displayed. (for MAC Loopback, MAC address is displayed)

Program Rate is the frame rate set by user.

Actual Rate is the real frame rate during the test. The rate may differ from Program Rate due to delay or collisions in the network.

Latency

141.184.48.51

Test Time:	00:00:03
Frame Length:	64
Iterations:	5
Current Delay:	0.001270 Sec
Average Delay:	0.005054 Sec
Minimum Delay:	0.001140 Sec
Maximum Delay:	0.009930 Sec

Plots   Save Results   Stop Test

Frame Loss Rate

141.184.48.51

Test Time:	00:02:48
Frame Length:	1518 Bytes
Frame Rate:	732 fps
Step Size (%)	90
Upstream	
Frames TX:	4392
Frames RX:	4392
Errors RX:	0
Frames Loss:	0

Plots   Save Results   Stop Test

2:16 PM   45%   50%

Back   Main Menu   Help

The IP address of the FrameScope. If the name exists, it will be displayed. (for MAC Loopback, MAC address is displayed)

Upstream - frames sent from / received by the master FrameScope.

Back-To-Back

141.184.48.51

Test Time:	00:00:21
Frame Length:	64 Bytes
Iterations:	4
Frame Rate:	14881 fps
Burst Size	29762
Upstream	
Frames TX:	29762
Frames RX:	29762
Errors RX:	0

Plots   Save Results   Stop Test

2:39 PM   45%   50%

Back   Main Menu   Help

RFC 2544 Test Results

10.10.11.82

◀ Throughput #3
4/17/2004 02:39:18 ▶

256 Bytes (100.000 Mbps)

Upstream **Downstream** **Max**
8156   8156   45290

148K
fps
0
64   Bytes   1518

Benchmarking

▸Throughput (Asym)

Latency

🕐 2:04 PM   📱 🔋 45%   CF 50%

◀ Back   Main Menu   Help
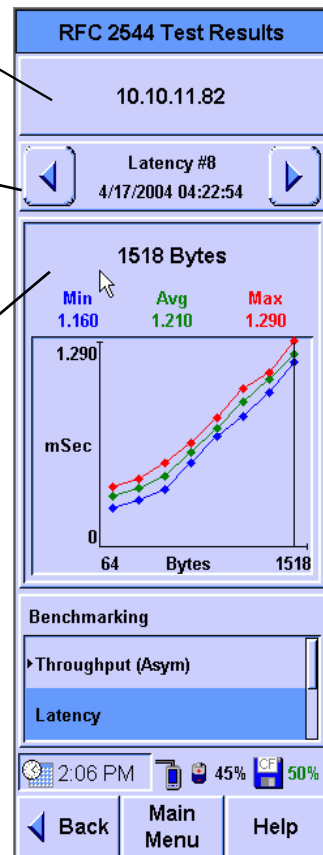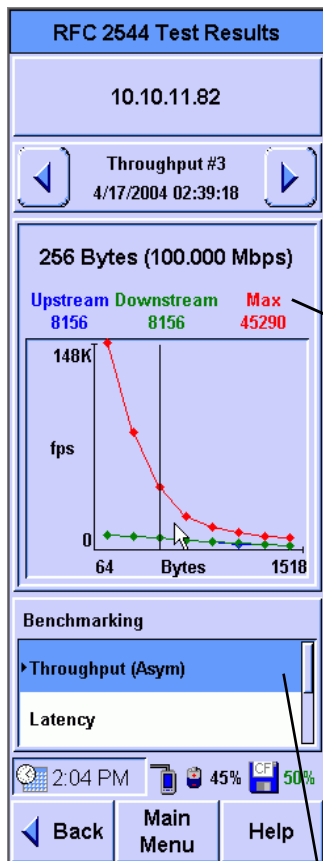
The IP address of the FrameScope (for loopback scenarios, MAC address). If the name exists, it will be displayed.

The throughput/ latency test set, according to frame size. Press the left or right button to go to the previous or next test set respectively.

Upstream - throughput rates of frames sent from master FrameScope.

Downstream - throughput rates of frames sent from slave FrameScope.

(For bidirectional, single throughput rates for both direction will be plotted.)

Max - maximum theoretical frame rate.

Below frame directions are frame throughput rates in frames per

Click this to change the Y axis in the chart display.eg., display changes in fps, bps,% (only for throughput results)

RFC 2544 Test Results

10.10.11.82

◀ Latency #8
4/17/2004 04:22:54 ▶

1518 Bytes

Min **Avg** **Max**
1.160 1.210 1.290

1.290
mSec
0
64   Bytes   1518

Benchmarking

▸Throughput (Asym)

Latency

🕐 2:06 PM   📱 🔋 45%   CF 50%

◀ Back   Main Menu   Help

The minimum, average and maximum delay of frame obtained from an average of multiple measurements depending on the number of iterations set.

RFC 2544 Test Results

10.10.11.82

Frame Loss Rate #6
60% (100.000 Mbps)

Frame Length
64 Bytes
Upstream
92.1

100.0

Loss(%)

0

10   Load(%)   100

Benchmarking

Frame Loss Rate

Back-To-Back

2:11 PM   45%   50%

Back   Main Menu   Help

The IP address of the FrameScope. If the name exists, it will be displayed.(mac address for loopback)

Frame loss rate or back to back tests. For Frameloss rate, load percentage will be displayed along with maximum data rate.

Used to display the result screen for different frame length. The graph can be traced easily from the color of the frame length display.

Select to browse between graphs for upstream and downstream bi-directional test results(valid only for bi directional test

RFC 2544 Test Results

10.10.11.82

Back-To-Back #1
4/17/2004 05:30:33

64 Bytes (100.000 Mbps)

Bi-Directional   Frame Rate
1572   148810

1572

Frames

0

64   Bytes   1280

Benchmarking

Frame Loss Rate

Back-To-Back

2:16 PM   45%   50%

Back   Main Menu   Help

Locating a Port with Blink Port

You can use the FrameScope's test port, located on the side, to locate a network connection's port on a hub or switch. The FrameScope will toggle the port's link indicator on and off causing it to blink.

This section describes how to use the Blink Port feature of the FrameScope Pro.

1 Connect the FrameScope to the remote end of the circuit whose hub you want to locate. For example, connect the unit at the network wall circuit.

2 Press the **Tools** button on the main Network tab to display the Tools menu.
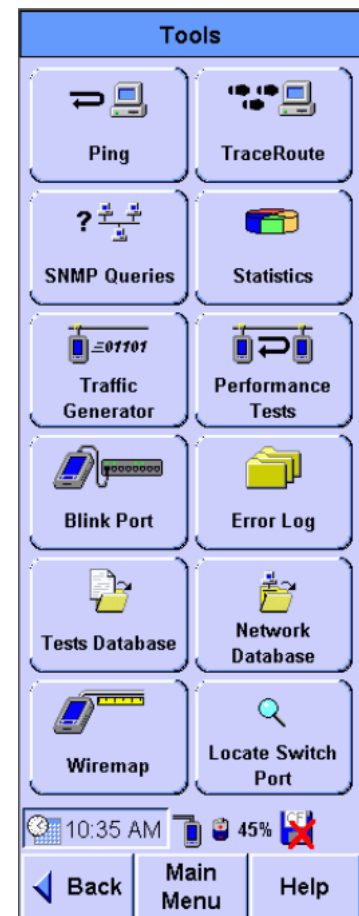
3 Press the **Blink Port** on the tools menu to call the Blink Port screen.

4 To begin blinking the port, press the **Start** button.

5 Observe the hub or switch and note which port's link indicator is blinking. That will be the port for the tested circuit.

6 To stop the blink, press the **Stop** button on the Blink Port screen.

Viewing the Error Log

This section describes how to view the FrameScope's error log. The error log tracks and displays any network problems that are detected by the FrameScope Pro.

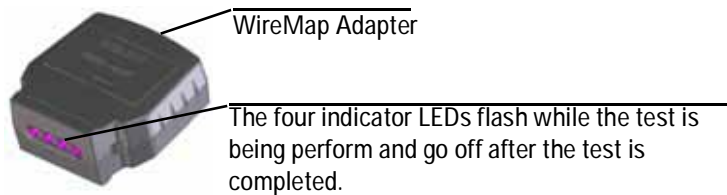1 From the main Network tab, press the **Tools** button to display the Tools menu.
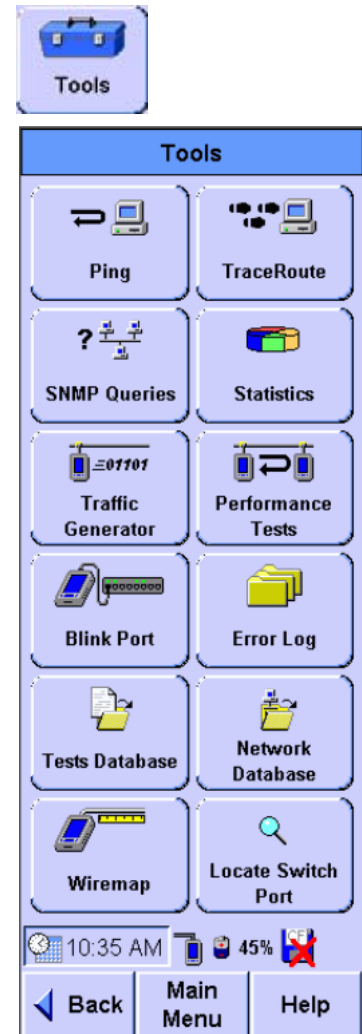
2 Press the **Error Log** button to call the Error Log screen. You can also click on the shortcut, in the Main Menu to get to this screen.

3 Observe the errors listed in the log.

4 Press the **Show All** button to expand the error list and view all errors that were previously acknowledged by using the **Ack** button.

5 Press the **Ack** button to acknowledge the errors without clearing the log.

6 Press the **Reset** button to clear the log.

WireMap Adapter Testing

WireMap testing checks for proper continuity and termination of cables. It is used together with the WireMap Adapter .

WireMap Adapter

The four indicator LEDs flash while the test is being perform and go off after the test is completed.

The wiremap adapter is connected at the far end of a link or channel to display and identify point-to-point four twisted pairs connection.

Channel or Link
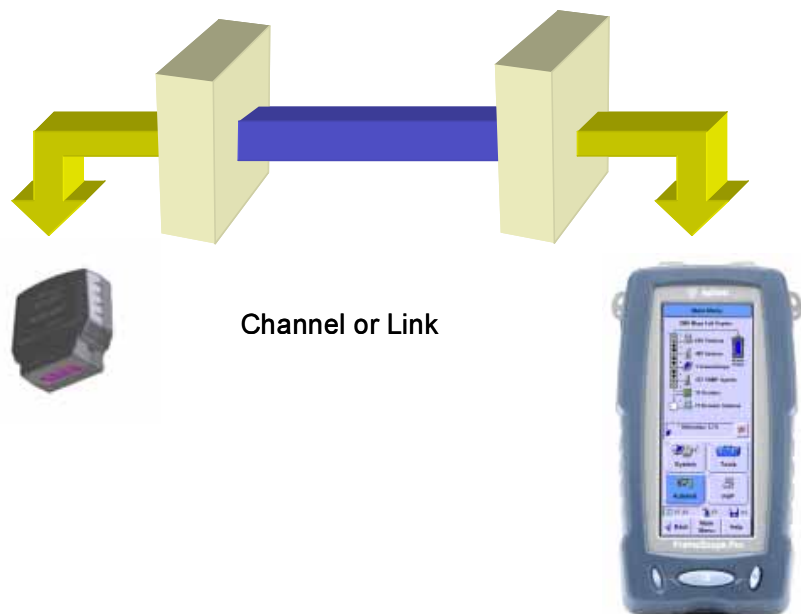
The test identifies the following faults:

- Short circuit
- Open circuit
- Reversed pairs
- Crossed pairs
- Shield continuity faults

WireMap Adapter Operation

When the wiremap adapter is connected to the FrameScope, the FrameScope sends a sequence of DC, TTL level signals through the wire pairs in order of a few 100 milliseconds. For each step of this sequence of signalling, the DC voltage is measured by the receiver of the FrameScope. The FrameScope software identifies wiremap information based on the readings.

LED Indicators

The wiremap adapter has four LEDs, each connected to a wire pair. The wiremap adapter has four LEDs, each connected to a wire pair. During the test, the LEDs flash. Once the test is completed, the LEDs turn off.
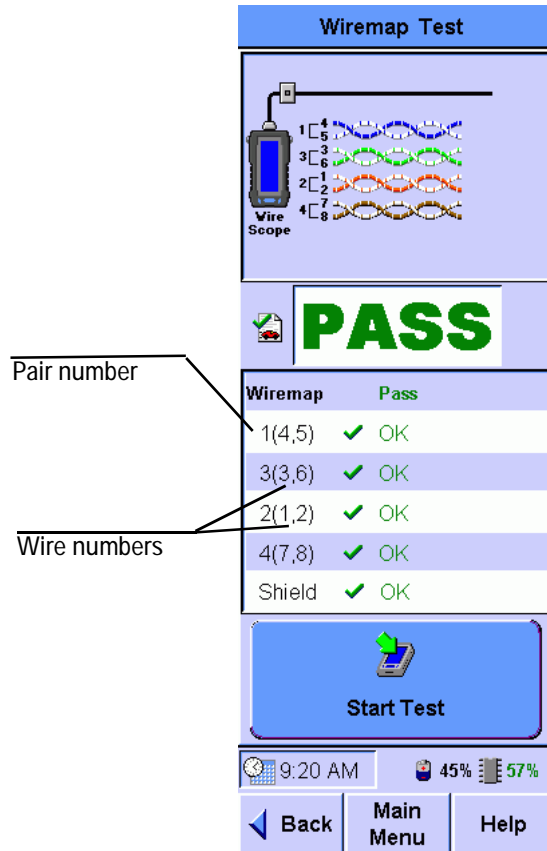
Procedure for WireMap Testing

1   Connect the FrameScope and cable under test to the WireMap Adapter.

2   From the Network Main Menu, press Tools, then press WireMap.

3   Click Start Test.

The test will run for a few seconds before displaying the results. If all tests pass, the results screen will display "Pass", similar to the screen below.

Pair number

Wire numbers

Otherwise, results will show "Fail" with details of error in red.

Using the Test Database

The FrameScope Pro allows you to store (you must have a CompactFlash™ card installed) Autotest and Performance Test results for later review and downloading. See for saving Autotest results, for saving loopback test results and for RFC 2544 test results. You can recall previously stored test data using the Tests Database tool.
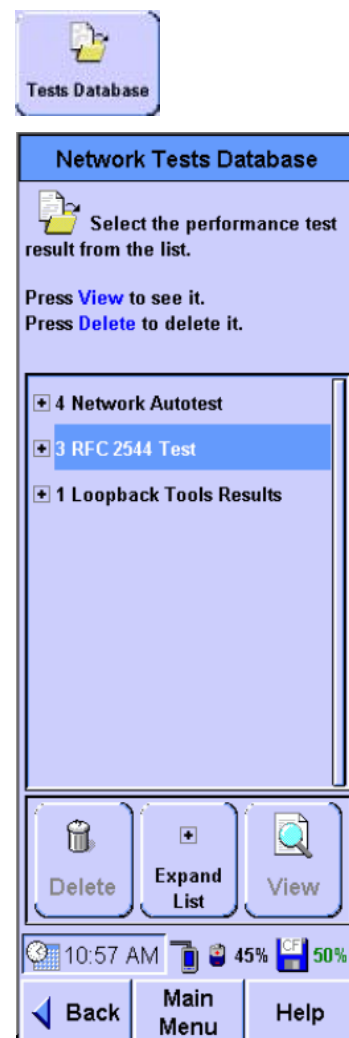
This section describes how to recall and delete stored tests.

1   Press the **Tools** button to call the Tools menu.

2   On the Tools menu, press the **Tests Database** button.

Three folders appear in the Network Test Database screen. Network Autotest results are stored in the **Network Autotest** folder. RFC 2544 throughput and latency test results are stored in the **RFC 2544 Test** folder. IP and MAC loopback test results are stored in the **Loopback Tools Results** folder.

The number before the folder names indicates the number of stored files in the folder.

3   Select the folder and press the + sign, or the **Expand List** button.

4   Select the test results file, then press the **View** button to display the detailed test results.

5   To delete a stored test, select the test results file and press the **Delete** button.

Using the Network Database

The FrameScope Pro allows you to store (only on a CompactFlash™) network topologies for later review and downloading (see "Using the Stations List" on page 33). You can recall previously stored network data using the Network Database tool. This section describes how to recall and delete stored network data.

1　Press the **Tools** button on the Network Main Menu to call the Tools menu.

2　On the Tools menu, press the **Network Database** button to call the Network Database screen.

3　Network resources are displayed in a list. Use the Scroll button or a stylus to select the resource you want.

4　Use the Expand and Collapse buttons to show the items under the selected resource type.

5　When a network resource is selected, press the **View** button to view detailed information about it.
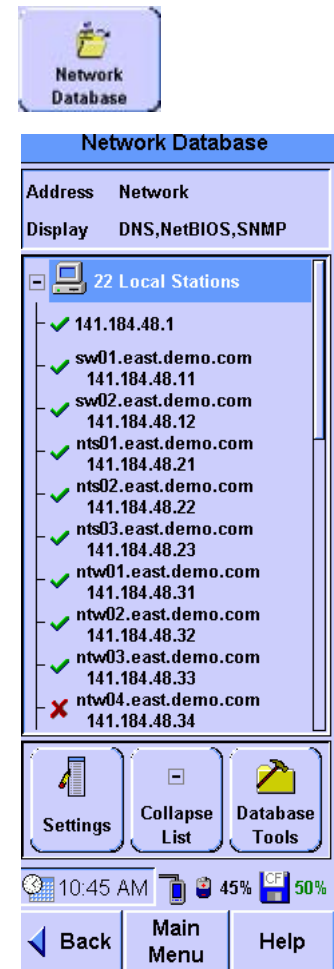
The Expand, Collapse, and View buttons occupy the same spot on the screen. The button changes depending on what you have selected in the network list.

6 To access the Database Tools menu press the **Database Tools** button.
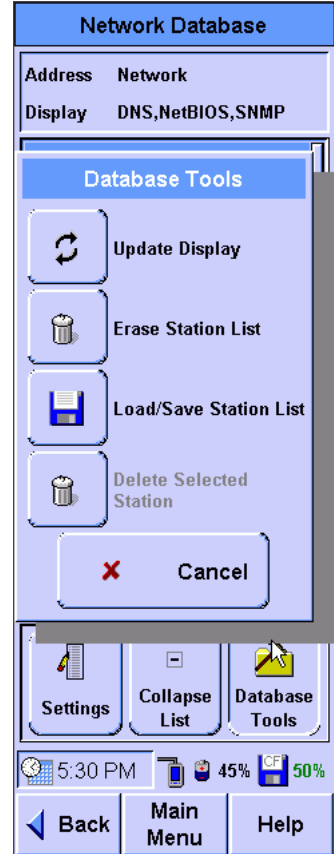
7 To save the current network, or to load previously stored network data, press the **Load/Save Station List** button.

8 Use the buttons on the Station List name screen to store the current network data, load stored data, or delete stored data. If you are storing data, you will be prompted to enter a name for the data file.

Locating Switch Ports

The FrameScope Pro allows you to identify the switch ports being accessed by the FrameScope or any address on the network.

The FrameScope will only locate switches in the same subnet. Knowledge of the correct community string and port is essential.

This section describes how to operate the Locate Switch Port tool.

1 Press the **Tools** button to call the Tools menu.

2 On the Tools menu, press the **Locate Switch Port** button to call the Locate Switch Port screen.

3 Select the target, either this FrameScope or enter the name or address of the device you want to locate.

4 The SNMP Settings button allows you to add SNMP communities and ports to the default "public" community and default port 161 or to change those set up for auto discovery.

5 Press **Start** to see the results of the Locate Switch Port.

6 Use the Scroll button to scroll through the list if necessary.

NOTE	The order of the information presented is not useful and should not be used in interpreting the list.

Locate Switch Port

ctoserver1
141.183.31.73

Found on Switch Port:

Switch/Bridge: 141.183.31.67
  Hierarchy Level: 1
  Name: COLNT-WGSW02
  Port: (26) B
  Type: ethernetCsmacd
  Speed: 100 Mb
  Status: UP

Switch/Bridge: 141.183.30.51
  Hierarchy Level: 2
  Name: DEFAULT_CONFIG
  Port: (16) B8
  Type: ethernetCsmacd
  Speed: 100 Mb
  Status: UP

Switch/Bridge: 141.183.30.208

Start

1:54 PM   45%

Back   Main Menu   Help
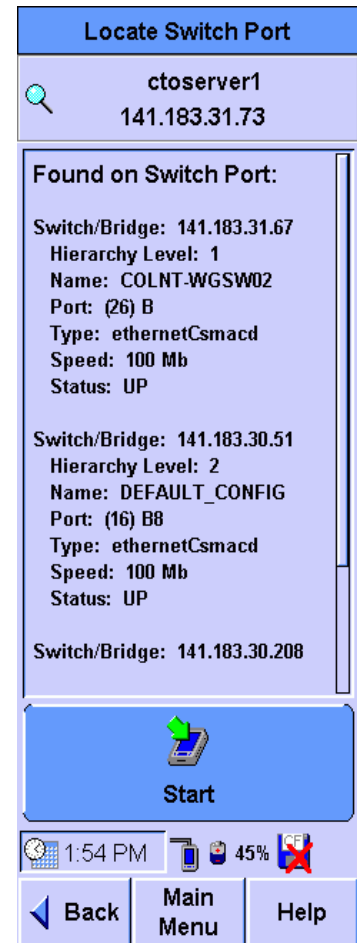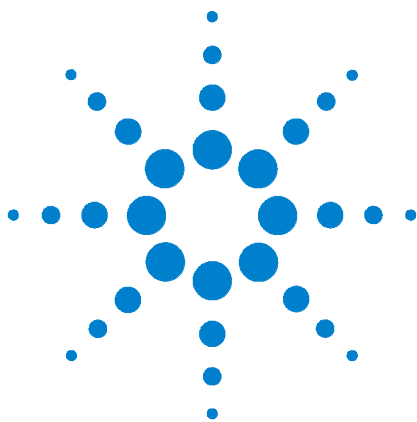
3

Voice Testing with the FrameScope Pro

The Agilent FrameScope Pro Voice Performance Analyzer is a powerful handheld instrument that measures the performance of voice over IP networks.

This chapter deals with voice testing.

Agilent Technologies

Voice Testing Overview

The Voice Quality Analysis software for the Frame Scope Pro, gives you analysis options for voice-over-IP (VoIP) environments that traditional tests do not. Including:

• Access, manage, and run Voice Quality Tests end-to-end across widely deployed Voice networks.

• Test VoIP network components such as routers, gateways, PBXs, and switches.

• Compare VoIP quality directly with existing toll quality networks.

• Test VoIP systems to gather end-to-end voice quality information.

• Augment other traditional telephony test suites such as Transmission Impairment Measurement Set (TIMS).

• Measure fundamental voice quality metrics such as delay, Jitter and Mean Opinion Score (MOS).

How the FrameScope Pro Tests Voice Quality

To test voice quality and measure audio circuit characteristics, the FrameScope Pro VoIP does two things:

• It places and/or answers one telephone call at a time to establish voice connections. This voice connection (and the transmission media and equipment of which it is comprised) becomes the *network under test*. Think of the FrameScope Pro VoIP as a telephone or other telephony device positioned at the ends of voice circuits.

• Once the FrameScope Pro VoIP has established at least one telephone call, it transmits audio test packets onto that circuit and measures how those packets are affected by traveling through the network under test. The FrameScope Pro VoIP can send test packets in one direction at a time depending on how that circuit was established.

Running a Voice Test

This section describes how to run an VoIP Test on the network using the FrameScope Pro.

From Main Menu, **VoIP** button has to be pressed to enter the VoIP Test mode. Once you do so, SIP Settings window will appear with the configurable parameters.
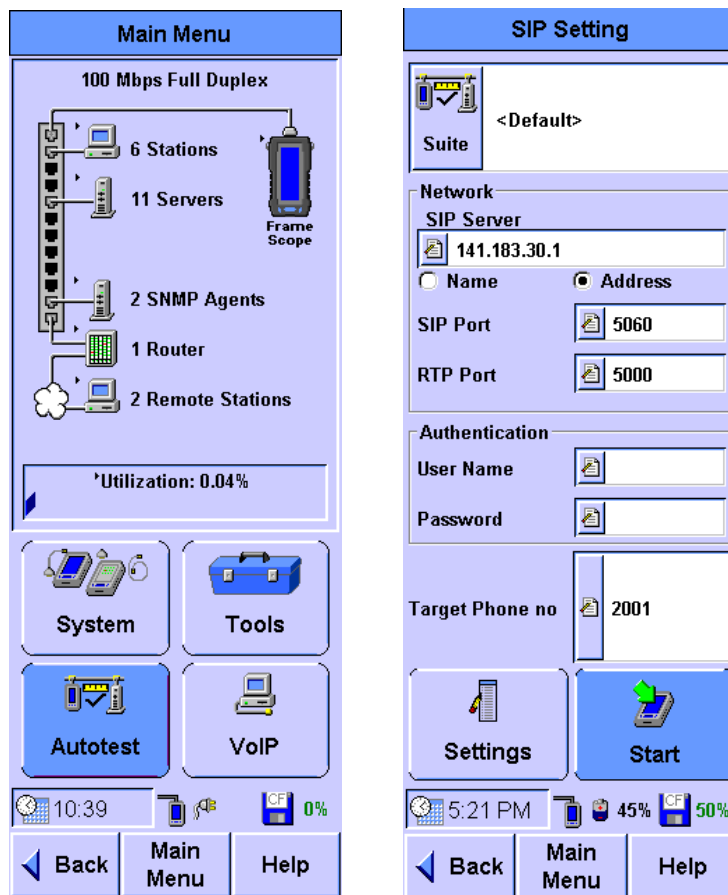
The settings can be saved and retrieved through the Suite window/button on the left hand top corner. For additional settings, click on the **Settings** button (refer the image on the next page for detailed description).

| NOTE | The user name for authentication with the SIP server may not be the same unique ID or phone number used for the SIP phone call or test. |

Codec to be used for data transfer:
G711μlaw or G711Alaw

Phone number that
FrameScope registers as its
own.

If checked
FrameScope will auto
answer incoming call

Headsets call for live audio.

The maximum allowed
time between session
refresh requests in a
dialog before the session
will be considered timed
out.

This box, when checked, registers
with Registrars/SIP server.
Otherwise calls directly the IP
address specified in the SIP server
box in the SIP Setting window.

Minimum value that
can be set for the
session interval, this
value is called the
minimum timer

This box, when checked, allows
the end point to send or answer
reinvite and configure the
associated session interval,
min-SE interval and refresher.

This has to be set to
the entity (UAC, UAS
etc.) which initiates
reinvite.

Nickname for the mode/option as
determined by the user.

Domain name for SIP
server (which requires
name instead of IP),
when DNS is not
present in the
network.

Drop down list allows selecting
different stack options.

SIP

Phone
Codec Type   G711 U Law
Phone Number   22222021...

Auto Answer Incoming Call

Headset Call

Register

KeepAlive

Session Interval   300
Min-SE Interval   300
Refresher   UAC

SIP Standard Used
Label
Options   Mode 03D
DNS Name

Previous   OK   Cancel

When the **Start** button is pressed in the SIP Setting Window, The FrameScope Pro registers with the registrar/ SIP Server as per the options selected by the user in the SIP setting Window asks to do so, before placing a call or sending an Invite message.

Else, it calls directly to the IP address specified in the SIP Server window.

The SIP call is placed to the Target Phone number with either G711 a-LAW or G711 u-LAW as per user selection on the Settings screen. After SIP signaling is completed, data flows across the network and the measurement statistics appear in the Test Result Display Window. The user can save the test results to the CompactFlash™ using the **Save Results** button.

Once the test stops, the SIP signaling log can be seen when user clicks on **Details** button. Graphical plots of the VoIP test results with respect to time can also be viewed offline. For further information on this topic refer to the section below.

Interpreting Results

The statistics measured are plotted in graphical format. The graph is plotted offline with timing info displayed as iterations (the interval is 500 ms) in X-axis and R-Factor, MOS, Packet Loss Ratio, Packet Round Trip delay, Inter Arrival Jitter values in Y-axis.

Each iterations shown is based on the RTCP message exchange during the VoIP test.

- The Inter-arrival jitter, Total Packet Loss and Packet Loss Ratio are based on the received RTP packets. Round trip delay is based on other part RTCP packet information,

- R-FACTOR, MOS are based on Inter-arrival jitter, total packet loss and packet loss ratio and Round trip delay, if the other part has no RTCP packet sent, then the Round Trip Delay will set to zero.

- Total Packets Sent are counts packets sent from the FrameScope Pro which is displaying the results and not from the other party.

- Total Packet Lost. This is based on "Cumulative Number of Packets Lost" in RFC1889/3550.

- Packet Loss Ratio. This is based on "Fraction Lost" in RFC 1889/3550

- Total Packets DiscardedTotal Packets Discarded refers to the number of packet dropped at the receiving side if there are erros in RTP header information,

- Packet Discard Ratio.This refers to the interval Packet Discard Ratio, which is the discarded packet ratio for each RTCP interval.

Network Settings

The FrameScope Pro VoIP software can connect to the network using Point-to-Point-Protocol Over Ethernet (PPPoE) or IP Over Ethernet (IPoE). This setting is available in the Network Settings screen, described in

License Information

This shows the features available in the current version of the software. When user selects this from the Systems Menu and clicks Edit , License Details will be displayed with all the available features. User can enable new features by entering a license key. To purchase a license key, please contact your Agilent salesperson.
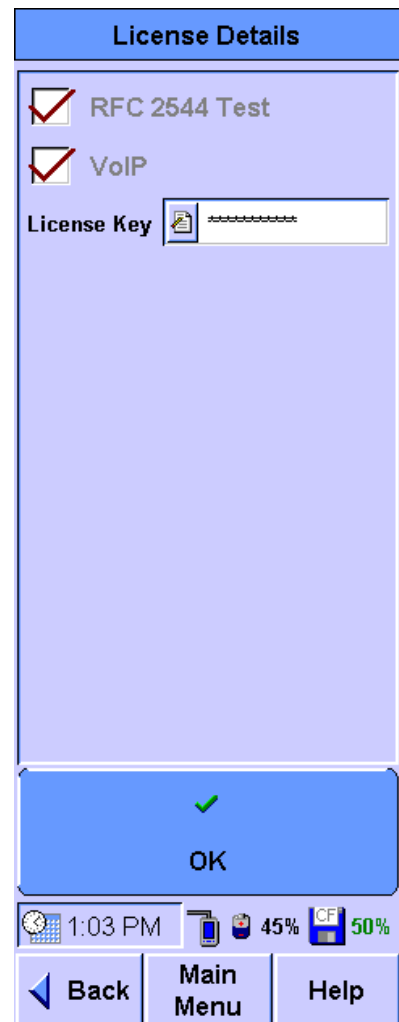
How to Save and Retrieve Results

The FrameScope Pro VoIP test results are saved to the CompactFlash^{TM}.

You can recall previously stored test data using the Tests Database tool. This section describes how to recall and delete stored tests. Press the **Tools** button to call the Tools menu. On the Tools menu, press the **Tests Database** button.

FrameScope Pro VoIP test results are stored in the FrameScope Tools Results folder. The number before the folder names indicates the number of stored files in the folder.

Select the folder and press the + sign, or the **Expand** List button.

Select the test results file, then press the **View** button to display the detailed test results.

To delete a stored test, select the test results file and press the **Delete** button.

The VoIP Test results can also be retrieved from the FrameScope Pro when its web server is enabled. The results are available in .CSV, HTML or JAVA format. (Please refer to "Remote Control" on page 114).

4

System Operations

This chapter describes the various system operations of the
FrameScope Pro.

Agilent Technologies

The Status Display Area
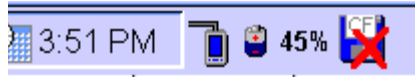
The status display shows the current time set on the FrameScope Pro, talkset status, battery status, and storage status.

Clock Display

The clock shows the time of day. It can be set in the Time and Date section of the System settings menu.

Network Connection Status

FrameScope icon: When in the Network tab, the FrameScope icon appears. If a red X is shown on the connection, it means the FrameScope is not connected to the network.

Battery/Power Display

Ac Power icon: This icon appears when the ac power adapter is connected to the FrameScope and an ac power source. The number next to the icon is the percent of full battery charge.

Battery Charge icon: When the FrameScope operates using battery power, this icon shows the current battery state. The percentage figure is the amount of charge remaining in the battery.

Storage Status

Storage icon: The storage icon indicates the status of CompactFlash™ and the percentage of store available in it.

= CompactFlash™ Card is installed. In the example, the card is half full. A red X on the icon means that the CompactFlash™ card is not installed.

The System Menu

The FrameScope Pro System Menu is displayed by pressing **System** in Network Main Menu.

System Information

Pressing **System Information** then pressing **View** on either System Settings menu displays the FrameScope serial number, software and hardware revision numbers.
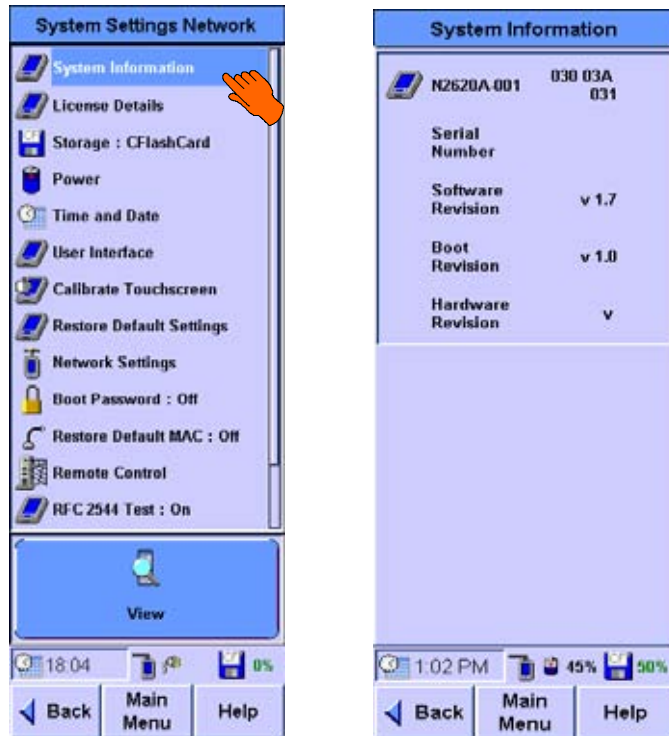
License Details

NOTE	For the License Details of FrameScope Pro with VoIP Option please refer to "License Information" on page 93.

This shows the features available in the current version of the software. When user selects this and clicks **Edit** , License Details will be displayed with all the available features. User can enable new features by clicking the checkbox and entering the corresponding license key. For acquiring license key, please contact the Technical Support Centre
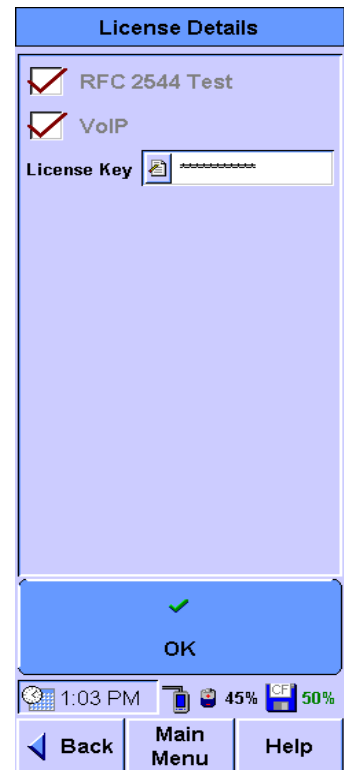
Storage Setup

This allows you to see the total capacity and percentage of usage of CompactFlash™ and internal flash.If the user selects next and CompactFlash™ is present in the system, the option to format the CompactFlash™ pops up. User can select YES to proceed with the format or press cancel.

Battery Status

To view the current battery status press **Power** then press **View**. The display also shows an estimated remaining battery time.

Time and Date Setup

To set the time and date on the FrameScope, press **Time and Date**, then press **Edit**. The Time and Date Setup screen allows you to set the Month, Day, Year, and Time as well as the display method for each.

User Interface Setup

The User Interface Setup screen is were the following choices are made:

Enable Touch Click   ON/OFF

Enable Sleep Timeout   ON/OFF - A screen touch will wake the screen. When enabled the Sleep Interval setting bar is displayed.

Sleep Interval (Minutes)   how many minutes (1-15) without a screen touch or button press until the unit goes to sleep.

Enable Speaker   ON/OFF

Volume Control Scale of 1 to 15

Contrast   Scale of 1 to 15

Boot Password

To protect the FrameScope Pro from unauthorized use you can set a password that must be entered before the instrument boots up. By default, the FrameScope Pro has no password protection.

To enable the boot password:

1   In the system menu, select **Boot Password**.

2   To enable the password, make sure the box **Password checking enabled** is selected.

3   If you want to enter a new password, or change the existing password:

   a   Make sure the box **Change Password** is selected.

   b   Enter the password in the **New Password** and **Confirm New Password** fields.

4   Press **OK**.

Touchscreen Calibration

If it seems that the FrameScope is not responding correctly to taps on the touch screen, you may need to calibrate the touch screen to bring it into alignment with the underlying display.

To calibrate the touch screen:

1 Ensure that you have the stylus available.

2 On the Main Menu, press **System**. The System Settings screen displays.

3 On the System Settings screen, press **Calibrate Touch Screen**, then press **Edit**. A Calibration screen displays.

4 Using the stylus, press the screen where the onscreen instructions direct. Since the co-ordinate readings are very sensitive, you should touch exactly on the point where the screen drawing for the stylus indicates.

5 When the calibration is complete, the System Settings screen displays.

Calibration
Press indicated corner with stylus. Indication will move to next position when reading is complete. (The active area is in blue.)

Restore Default Settings

The following procedure describes how to restore the
FrameScope Pro to the configuration values that were set when
your unit was shipped from the factory.

1   From the Main Menu on either the
    Network tab, press the **System**
    button. The System Settings screen is
    displayed.

2   Use the Scroll button to select **Restore
    Default Settings**.

3   Press the **Edit** button or press the **OK** button to call the Restore Defaults screen.

4   If you want to clear data in the internal flash and return to the default settings and profiles of the FrameScope, press the **Format Internal Flash** checkbox.

5   Press **OK** to restore the factory-programmed settings.

6   Because this will erase any current settings, you are asked to confirm. In the subsequent confirmation dialog boxes press **Yes** to accept the resets. Press **No** to cancel the resets and return to the System Settings screen.

7   If the Format Internal Flash option is selected, you MUST re-install the FrameScope Pro software.
See the FrameScope Pro Upgrade Utility manual for details on how to upgrade or re-install.
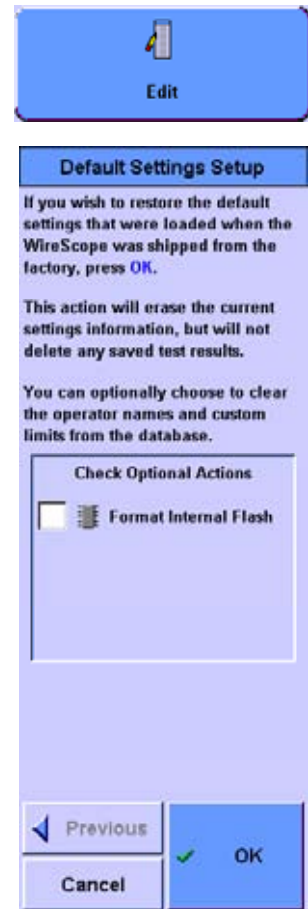
Network Settings

The Network Settings screen shows a summary of the network configuration. This screen may also be accessed by pressing on the FrameScope icon on the right of the Main Menu. This includes the following:

NOTE	For the Network Settings of FrameScope Pro with VoIP Option please refer to the Voice Testing Chapter page 93

The Network Settings screen can be reached by pressing on the FrameScope Icon on the Main Menu or by pressing **System** from the Main Menu and then pressing **Network Settings** and then **Edit**.
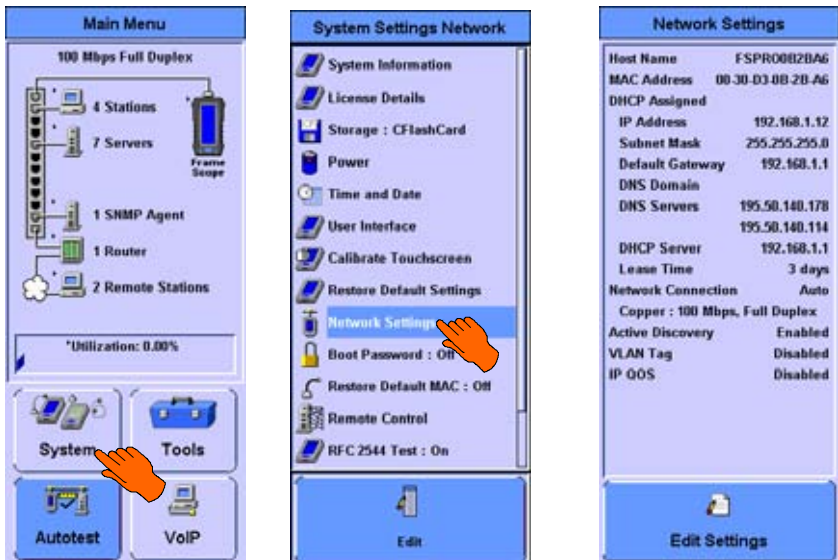
The information displayed includes Host Name (FrameScope Pro name, which by default is FRSCOPE plus the last three hex bytes of the MAC address, but it can be changed,) MAC address of the FrameScope Pro (This is a factory setting that identifies FrameScope uniquely among all Ethernet devices.), information assigned by DHCP or manually, Network Connection (Auto or Manual,) and whether Active Discovery and Measure Length are enabled or disabled. To change any of the settings, press **Edit Settings**.

The first Network Settings Setup screen allows you to select PPoE or IP addressing.

CAUTION   MAC address modification is not advisable.

If a modification is unavoidable, the changes should be done with extreme care so that it will not conflict with any MAC address that is in use.

- MAC Address - The MAC Address of the FrameScope.
  Usually it contains a value set in the factory. But this field can be used to change the MAC address if this is necessary for a specific case or to satisfy security requirements.

  The MAC address can be reset to the factory default on the next boot-up as described in "Restoring the Default MAC Address" on page 113.

PPPoE Settings   If you select PPPoE, you must also enter Username, Password and Domain in the PPPoE Settings Screen, after you press **Next**:

NOTE   PPPoE has no manual configuration of IP address, Sub-net mask or default gateway.

IP Settings   You can select DHCP to automatically configure the FrameScope Pro when connected to the network, or manually configure the IP address, Gateway, Subnet Mask and other settings. If you manually configure the IP settings, you have to at least enter a valid IP address and a valid subnet mask.

- IP Address – This value uniquely identifies the FrameScope in the TCP/IP network.
- Subnet Mask – This value is combined with the IP Address to define the subnet to which the FrameScope belongs.

• Default Gateway – This is the default gateway (router) the FrameScope will use to communicate with devices on other subnets.

Press **Next** when satisfied with your choices.

The second Network Settings Setup screen allows you to change the Host Name from the default, enter a DNS Domain, and to provide DNS and WINS server addresses.

Host Name This name will be used to identify the FrameScope in NetBIOS and FrameScope protocols. The name defaults to 'FRSCOPE' plus the last 3 hexadecimal digits of the MAC Address. It may be changed to any name desired.

DNS and NetBIOS Settings Devices on the network may be referred to by name. In the Domain Name System (DNS), the FrameScope asks DNS servers to convert the name to an IP address. When NetBIOS names are used, the FrameScope asks WINS servers to convert the name to an IP address. The DNS Domain and the DNS and WINS servers can be learned through DHCP and may be entered manually by the user. If the user enters a DNS Domain, it will be used in place of the DHCP supplied value. If the user enters DNS or WINS servers, they will be used in preference to the DHCP supplied values.

When satisfied with all the settings, press **Next** to get the third Network Settings Setup screen.

Network Connection   Since network hardware may function at a variety of speeds and modes, the FrameScope has the ability to auto-negotiate its speed and mode when it is connected to the network. The auto-negotiation attempts to configure the devices for the fastest network connection supported. If necessary, the user can manually set the FrameScope for 10 ,100 or 1000 Mbps and full or half duplex mode (For Gigabit, only full duplex mode is available). This may be used for instance to prove that a 10/100 switch can properly support the 10 Mbps speed.User can also select whether to use Fibre interface or copper interface.
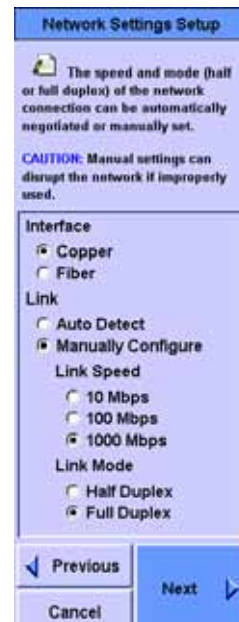
When satisfied with the settings, press **Next** get the fourth Network Settings Setup screen.

VLAN Support   FrameScope Pro supports C-VLAN (IEEE 802.1q) and P-VLAN (IEEE 802.1ad) tagging.
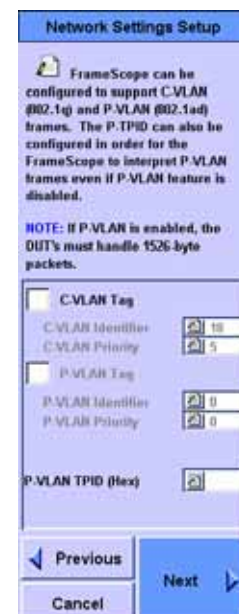
Enabling C-VLAN allows sending and receiving of q-tagged frames. Set the appropriate C-VLAN Identifier and C-VLAN priority. These values are dependent on the network under test's C-VLAN setting. Q-tagging is normally used to group different host traffic in enterprise networks as if these hosts are on a single LAN even if they are geographically separated from each other.

Enabling P-VLAN allows sending and receiving of ad-tagged frames (also know as Stacked VLAN). Set the appropriate P-VLAN Identifier and P-VLAN Priority. These values are dependent on the network under test's P-VLAN setting. AD-tagging is normally used in service provider network to separate different client traffic. Set a 4-hex digit value on P-VLAN TPID when testing on the service provider network. This value will be used by FrameScope Pro as the Tag Protocol ID (TPID) field to be inserted and stripped when enabling P-VLAN support. This field indicates that the packet is a P-VLAN packet in a service provider network. This field is dependent on the P-VLAN settings of a service provider,

so users should set this value appropriately. It can be set even if P-VLAN is not enabled to indicate to FrameScope Pro that the packet is a P-VLAN packet and should be interpreted by the device accordingly.

Press **Next** to go to Miscellaneous Settings Page when satisfied with the VLAN settings.

Miscellaneous settings

Active Discovery (Enable / Disable) When the FrameScope is attached to a switch port it only sees broadcast traffic and traffic targeted for the FrameScope. When 'Active Discovery' is enabled the FrameScope requests information from devices on the network to increase the amount of information the FrameScope can learn from the network.

NOTE

Active Discovery will affect the network and, in some cases, will trigger some alarms. Use at your own risk.

Erase Station List (Enable/Disable) The FrameScope automatically discovers stations on the network which it is connected to and shows these stations on the main window. The user can refresh this station list by removing and reconnecting the physical link (i.e. Fiber or Copper cable) when Erase Station List feature is enabled.

IP Qos (Enable / Disable) If 'Qos' is enabled, FrameScope will send IP packets with the IP TOS field set. User can select either to use IP TOS or IP Differential Service field (DSCP). If IP TOS is used, user can set the IP Priority along with TOS Value. If DSCP is used, user can set the DSCP value to be used in the IP Packets.

Flow Control (Enable/Disable) If Flow Control is enabled, FrameScope Pro will transmit flow control packets (XON and XOFF frames) based on the MAC FIFO's fullness.

When satisfied, press **OK**.

Restoring the Default MAC Address

If the MAC address of the FrameScope Pro is unknown, and you want to restore it back to the original hardware MAC address:

1 In the system menu, select **Restore Default MAC**.

2 To restore the hardware MAC address, make sure the box **Restore Default MAC at Next Boot Enable** is selected.

If you do not want to restore the MAC address on the next boot up, make sure this box is not selected.
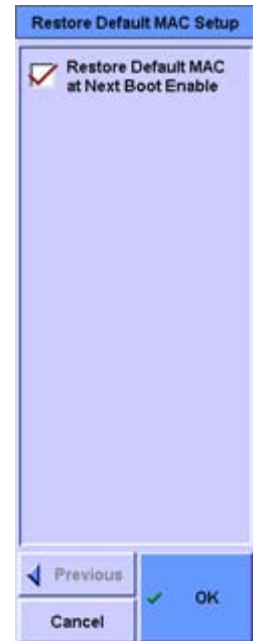
Remote Control

The FrameScope Pro can be controlled through a web interface. This can be done using the standard Test Port on the side of the FrameScope or with the *optional* Auxiliary Port on the top of the instrument.

For both methods, users have to install the latest FrameScope Pro Upgrade Utility. The essential files for remote control are installed using this installer. This can be found in the CDROM supplied. Users can also download from the web. Please visit www.framescope.com

Click on Remote Control in the System Settings and you will see the following screen.

This shows the status of the web server as well as the status of the remote control; that is, which port this remote control application uses. It also shows the IP address, subnet mask and default gateway of the designated port.

This screen can also show whether the link for the remote control is working.
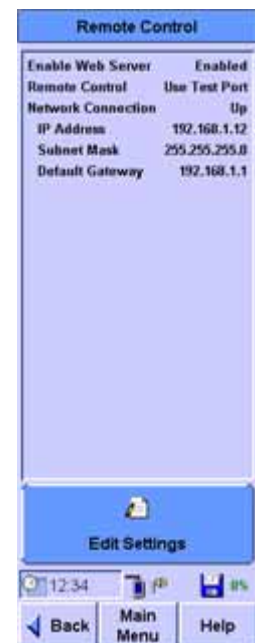
Enabling and setting the remote control web server

If you have an auxiliary port, you can choose whether to use this or the test port for remote control.
If you change the port used for remote control, you will have to restart the FrameScope Pro for the change to take effect.

You can also choose to increase the web access security by adding a User Name and Password.

You can also change the default port (80). If you change the Port Number, then you must specify the port number to access the FrameScope.
For example, if the FrameScope's address is 209.6.108.253, the URL would be http://209.6.108.253.
If Port 8080 is used, the URL would become http://209.6.108.253:8080

Whenever the Remote Control settings are changed, the FrameScope must reboot to use the new settings.

Starting remote control

The FrameScope Pro Remote Control can be evoked by either using the FrameScope Pro Remote Host or from the FrameScope Pro Web Page hosted by the FrameScope Pro.

The FrameScope Pro Remote Host can be launched from the Windows Start menu,
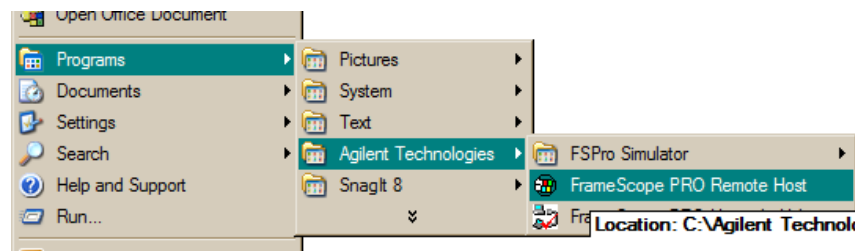
or from the web page on the FrameScope Pro, by clicking the link "Remote Control"

Once the Remote Host is running, you need to enter the IP address of the FrameScope Pro to be controlled. This IP address of the FrameScope Pro can be obtained from the Remote Control Settings Page on the FrameScope Pro.

Once the remote host connects to the FrameScope Pro, the screen of the FrameScope Pro can be viewed in the Remote Host
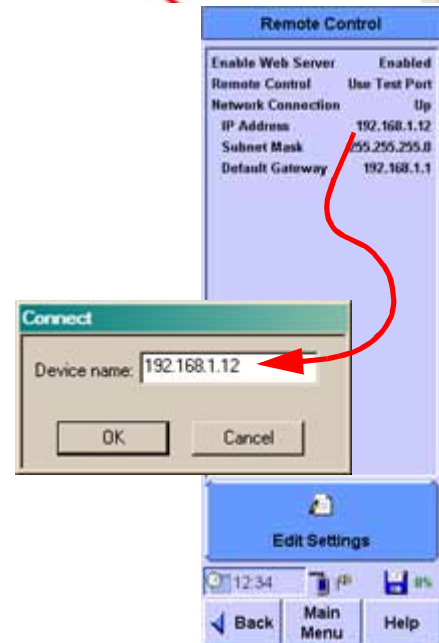
Control application as shown below. You can now control the
FrameScope Pro with the PC's mouse,.
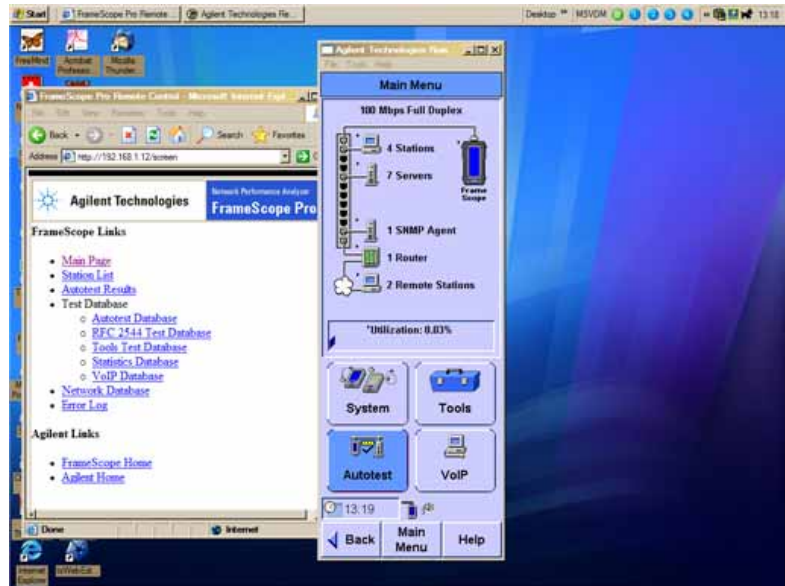
Setting up the Optional Auxiliary Port

To view the status of the Auxiliary port or to make changes to it, go to the Auxiliary Port settings, by highlighting Auxiliary Port Settings options under the System Settings Network.

The screen shows the status of the link of the Auxiliary port and the IP address, subnet mask and default gateway configured for the port.

To change the network settings of the Auxiliary port, click on the edit button and the Auxiliary port setup screen will appear.

CAUTION

MAC address modification is not advisable.

If a modification is unavoidable, the changes should be done with extreme care so that it will not conflict with any MAC address that is in use.

- MAC Address - The MAC Address of the FrameScope usually contains a value set in the factory. But this field can be used to change the MAC address if this is necessary for a specific case or to satisfy security requirements.
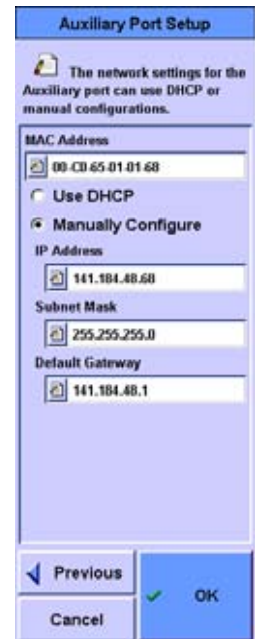
  The MAC address can be reset to the factory default on the next boot-up by turning "Restore Default MAC" on in the System Settings.

You can use DHCP to automatically configure the FrameScope when connected to the network, or manually configure the IP details. If you manually configure, you are required to at least enter a valid IP address and a valid subnet mask.

- IP Address – This value uniquely identifies the FrameScope in the TCP/IP network.
- Subnet Mask – This value is combined with the IP Address to define the subnet to which the FrameScope belongs.
- Default Gateway – This is the default gateway (router) the FrameScope will use to communicate with devices on other subnets.

If you make changes, a pop-up will appear asking you to restart the FrameScope Pro for the new settings to take affect.

RFC 2544 Test

Two FrameScopes or One FrameScope and a loopback device, are needed for RFC 2544 tests: round-trip latency test, point-to-point throughput test, frame loss rate tests and back to back tests. One FrameScope is the master and the other is the slave (if loopback is not selected), which is placed in the network point under test. The slave FrameScope has to be pre-set for RFC 2544 tests. For steps on slave FrameScope settings, see "Setting the slave FrameScope for RFC 2544 Tests" on page 65.

SNMP Settings

The FrameScope Pro uses the default community "public" and the default port 161 for SNMP access. You may expand the SNMP communities and port numbers to use during active discovery, SNMP queries, and the Locate Switch Tool. Press **SNMP Settings** on the Network System Settings screen then press **Edit**. Enter the additional information and press **OK**.

Demo Mode

The FrameScope Pro may be put in a Demo mode for training or demonstration purposes. The Demo mode provides for a network consisting of several stations, servers, a router, two switch/bridges, and 5 SNMP agents. All functions are demoable without connecting to a live network. Autotests of all functions are simulated.

The Demo mode may be enabled and disabled by pressing **Demo Mode:** on the System Settings menu then pressing **Edit.** When satisfied, press **OK**.

5

Network Performance Analyzer Reference

Agilent Technologies

Network Connection

Before the FrameScope Pro is attached to a network, it is constantly checking for a connection. When the FrameScope Pro detects that it has been plugged into a network device it does the following:

- Listens for a link pulse or traffic to determine which cable pairs are being used for transmit and receive. If this operation fails, a dialog pops up informing the user of the error, and the FrameScope Pro continues to listen for a link. This condition usually means that the network device is not turned on, or the connection from the FrameScope Pro to the device is faulty.

- Auto-negotiates wire speed and mode (optional). The user can manually set the speed and mode (half or full duplex) through the Network Settings wizard. The wire speed and mode are displayed on the network map on the Main Menu and on the Network Settings Window.

- Uses DHCP to obtain the following (optional):
  - IP address
  - IP subnet mask
  - Default gateway
  - DNS server
  - NetBIOS node type
  - NetBIOS Name Server (WINS)

  The user can manually set these parameters through the Network Settings wizard. These parameters are displayed on the Network Settings Window. If DHCP fails, a dialog pops up informing the user and asking if DHCP should be retried or if the FrameScope should give up. DHCP may fail if the DHCP server is not accessible from the FrameScope Pro's connection point or if the DHCP server's security is configured to deny access by unknown devices.

- Test the Default Gateway and the DNS and WINS servers. If any of these devices is not working, an error is recorded in the Error Log. The Default Gateway is tested by ARPing for its MAC address. The DNS and WINS servers are tested by looking up the FrameScope Pro's host name.

When all of this has finished, the FrameScope Pro is ready to monitor the network and perform network testing.

Network Database

The FrameScope Pro listens to the network traffic and actively interrogates network devices to learn about attached hosts, servers, switches and routers. This information is stored in the Network Database.   The database may be saved to or retrieved from CompactFlash™ or may be uploaded to a PC through the web interface.

Station List

The Network Database is organized into the following groups where each station is listed by name, if known, and address:

Local Stations   lists stations with any of the following:

- IP addresses on the same subnet as the FrameScope.
- IPX addresses in the same broadcast domain.
- MAC address, but no IP or IPX address.

Remote Stations   lists stations with any of the following:

- IP addresses not on the same subnet as the FrameScope.
- IPX addresses on the other side of a router

Servers   Lists stations that supply services, grouped by service

Routers   Lists stations that advertise routing capabilities or transmit traffic from remote stations.

FrameScopes -   Lists other FrameScopes found.

Switches/Bridges   Lists stations who support bridge MIBs through SNMP.

SNMP Agents   Lists stations who are running SNMP agents.

The operator can get more detailed information about any device by selecting it from one of these lists.

Device Details

The Network Database includes details learned about each device. The detailed information includes the following, where appropriate:

DNS, NetBIOS and SNMP System name

MAC address

Network addresses: IP and IPX

Services provided by the device (DHCP, DNS, etc.)

Protocols used by the device (IP, IPX, etc.)

While the device details are displayed, the following statistics pertaining to the device are also available by pressing the **Statistics** button:

Unicasts, where the% is the percentage of all unicasts

Broadcasts, where the % is the percentage of all broadcasts

Multicasts, where the % is the percentage of all multicasts

Errors, where the % is the percentage of all errors

The FrameScope Pro also provides a set of tools for accessing a device from the detailed view. These tools include:

Ping

Locate Switch Port

Trace Route (IP Only)

SNMP query (IP Only)

Performance Tests (loopback tests)

Active Discovery Process

Active Discovery Query order for FrameScope Pro

- Every 60 seconds:
  - Get SNMP name and bridge info
- Done once:
  - Broadcast PING
- Every 600 seconds:
  - Broadcast a DHCP discover message.
- Every 60 seconds:
  - Broadcast a FrameScope announcement (UDP to/from port 52341)
  - Broadcast RIP v1 and v2 routing table requests

- Every 300 seconds:
    - Send an ARP for each IP address in the subnet range
    - For every ARP response received, send an ICMP echo request
- Every 300 seconds:
    - Reset IP services
- Every 30 seconds (and whenever a new IP address is learned)
    - Discover IP Services
        a. Discover Domain Controller
        b. Discover Domain Browsers
        c. For each IP station in the station list which has not been probed yet:
            1) Query the DNS servers to get the hostname for the IP address.
            2) ARP the IP address
            3) Start a TCP connect to the LPD port to check for an IP printer server.
            4) Use SNMP to request the system name
            5) Use SNMP to request the subnet mask
            6) Start a TCP connect to the HTTP port to check for a web server
        d. For each MAC in the station list
            1) Mark as router any MAC that has more than one IP address associated, one of which is marked as remote
- Every 60 Seconds:
    - Broadcast an IPX SAP Request

Network Performance Autotest

The Autotest is used to measure connectivity and response time of important network resources. Each network resource is tested using target-specific access methods to communicate with these resources. The test results are compared to pre defined metrics and rated on a scale of 1 to 5, with 5 indicating the best performance. The criteria for the ratings can be adjusted so that the user can look at fluctuations in performace tuned to the resource's best possible performance.

Autotest Setup

The Autotest Setup screen can be reached by pressing on the **Autotest** button on the Main Menu.
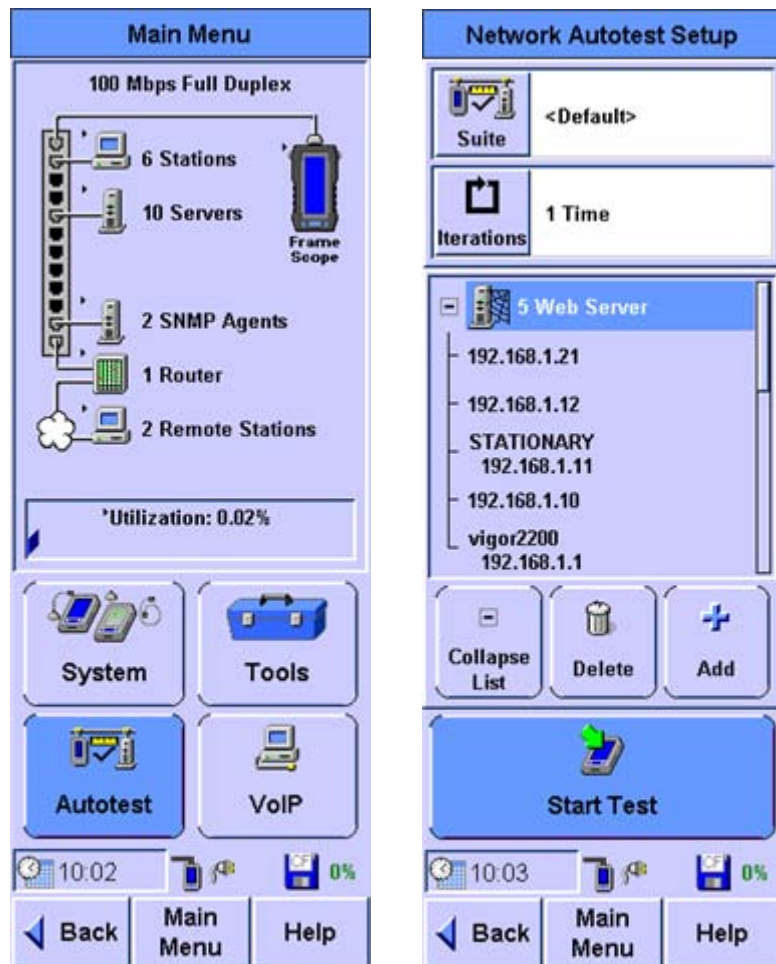
The Autotest contains a suite of tests that can verify multiple features on multiple devices. Each test within the Autotest suite verifies a specific feature on a specific device. For instance, one

device may act as both a DHCP server and a DNS server. An Autotest suite used to test this device would contain a DHCP server test and a DHCP server test for this device. The same Autotest suite can also contain tests for other devices.

The Default Autotest Suite

The FrameScope boots up with the <Default> suite selected. When the <Default> suite is selected, the FrameScope automatically creates an Autotest suite from the servers listed in the Network Database.

Editing Tests

Each test has parameters that specify the test's behavior and coverage. For instance, there is a well-known port for web servers to listen on, but a web server may have been configured to listen at a different port. So, the port number is provided as a parameter with the well-known port number as the default. User names and passwords are also included as parameters for tests that can provide extra coverage by logging in to a server. The extra coverage may include reading a file or retrieving E-mail. Each server has a default test that can be performed without the user providing any set up information so that a new test can be configured with minimal effort. After selecting a specific name or address, the **Edit** button starts up a wizard which allows the test's parameters to be modified. See the description of each test below for more information.

Deleting Tests

The **Delete** button operates on the selected test or test heading. If a test is selected when the **Delete** button is pressed, the test is removed from the Autotest suite. If a heading such as **6 Print Server** is selected, all of the print server tests will be removed from the suite.

Adding Tests

The Add button will start up a wizard which is used to add tests to the test suite.

If the Network Database contains devices with features not covered by any test in the test suite, tests for these features will be listed under **Untested Servers**. One of these tests may be added to the Autotest suite by selecting the test and pressing **OK**. All of these tests may be added to the suite by pressing the **Add All** radio button and pressing **OK**.

Another way to add a test to the suite is to press the **Create New** radio button and press **Next**.
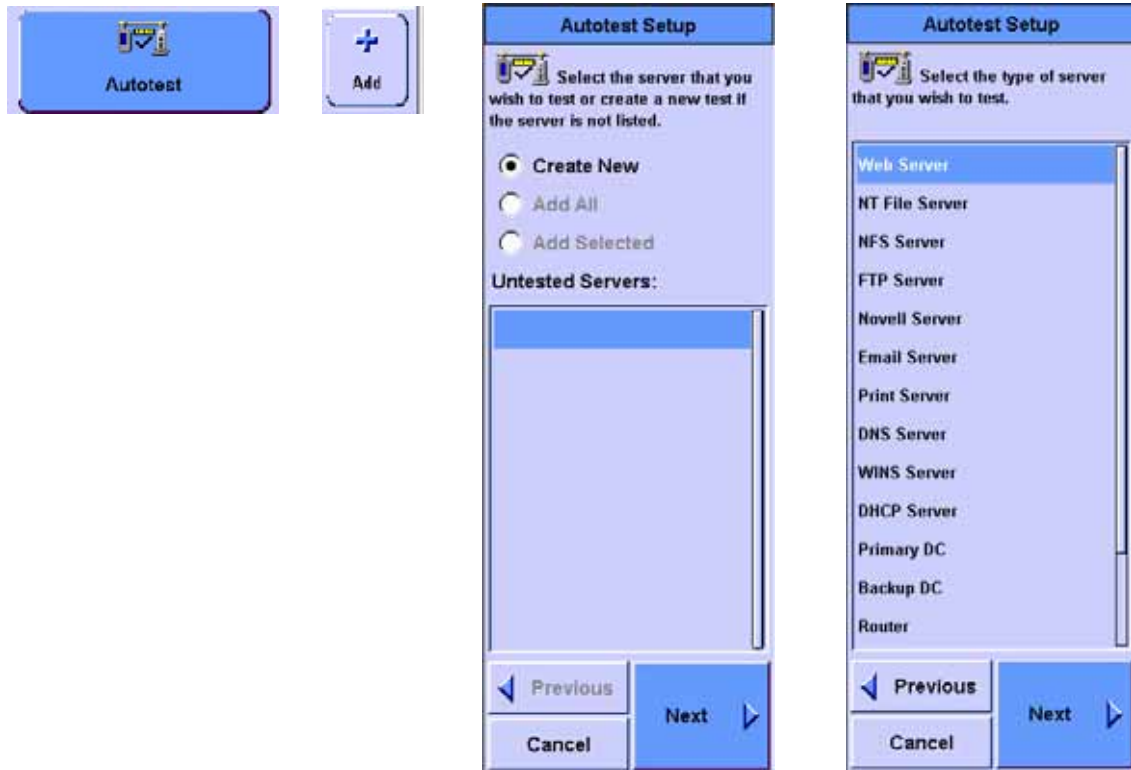
1   A list of test types is presented on the next screen.

2   Select the type of test and press Next.

3   Test specific parameters may be edited on the next screens as discussed below under each test heading.

DHCP Server

The DHCP Server test verifies that the DHCP server responds to a request for an IP address and other optional items. If any optional information is requested, the server response would be checked for all of the requested information.

Setup

The IP address of the DHCP Server to test is entered on the first DHCP Server test setup screen. All DHCP responses received during this test are compared against this address to verify that responses are being received from this server. The next setup screen is used to specify which optional items should be

requested from the DHCP Server. The last setup screen provides a list of the measurements performed during this test.
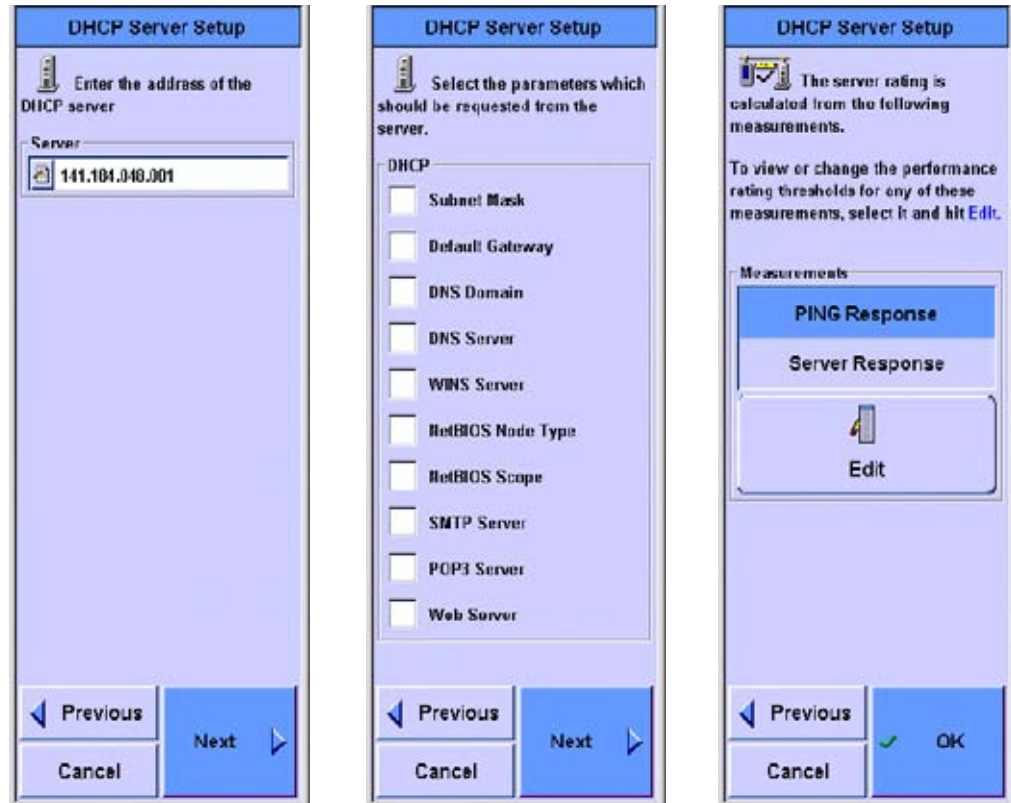
Any of the thresholds used to rate the performance of each of these measurements may be viewed and modified by selecting it from this list and selecting Edit. The measurements taken during this test are:

PING Response   The time it takes to perform an ICMP Echo test on the server.

Server Response The total time for negotiating for an IP
address from the DHCP Server

DNS Server

The DNS Server test verifies that the server can look up a name
or an IP address.

Test Setup

The first setup screen is used to enter the IP address of the DNS
server to test and to enter the name or address that will be sent
to the DNS server in the request. If no name or address is
provided, the DNS server is requested to look up its own
address and return a name.

The last setup screen provides a list of the measurements performed during the test. Any of the thresholds used to rate the performance of each of these measurements may be viewed and modified by selecting it from this list and selecting Edit as shown in the DHCP server.
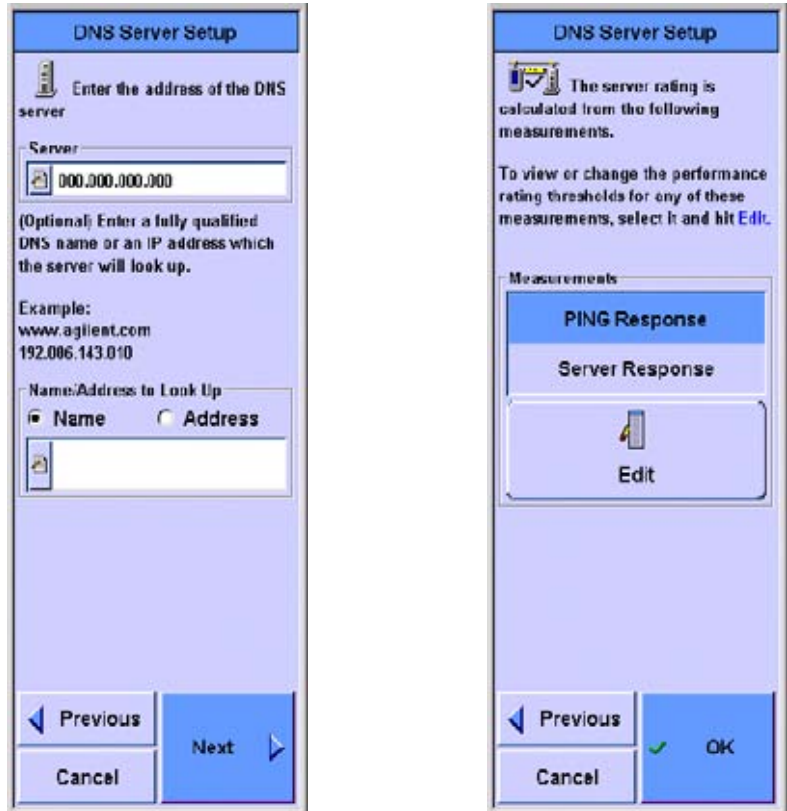
The measurements taken during this test are:

PING Response   The time it takes to perform an ICMP Echo test on the server.

Server Response   The request/response time for converting a name or address into an address or name.

WINS Server (NetBIOS Name Server)

The WINS Server test verifies that the server can convert a name to an IP address.

Test Setup

The first setup screen is used to enter the IP address of the WINS server to test and to enter the name that will be sent to the WINS server in the request.
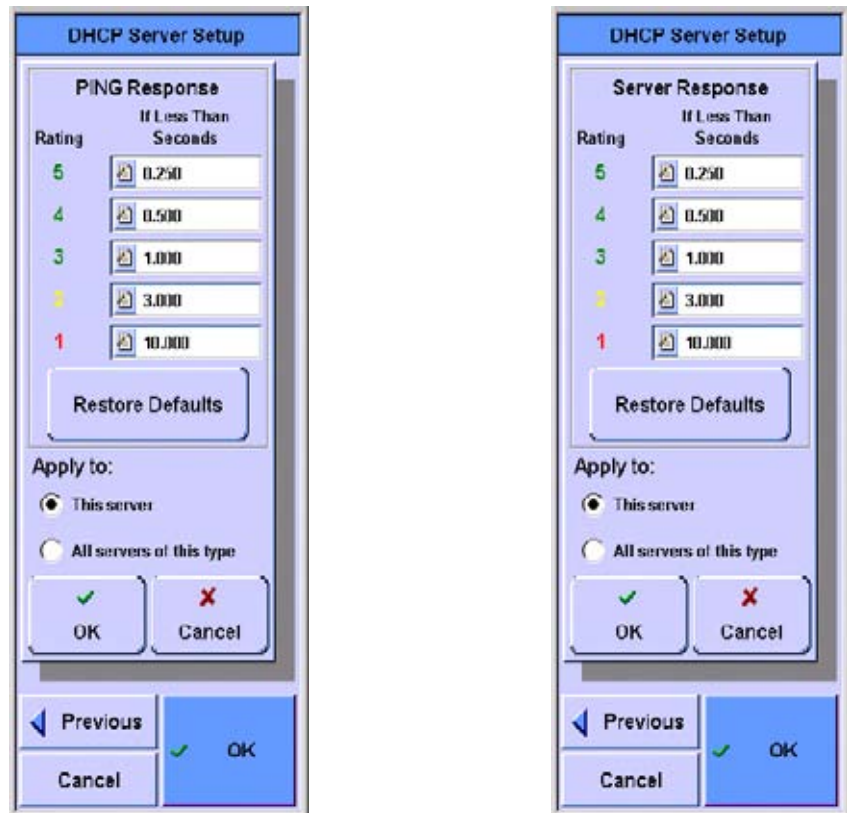
The last setup screen provides a list of the measurements performed during the test. Any of the thresholds used to rate the performance of each of these measurements may be viewed and modified by selecting it from this list and selecting Edit as shown in the DHCP server.
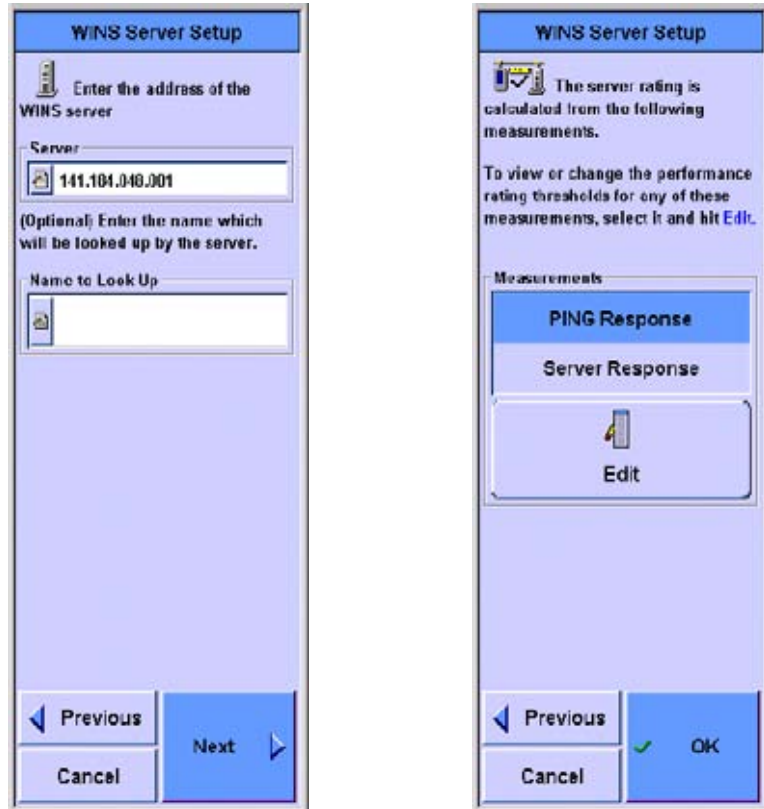
The measurements taken during this test are:

PING Response The time it takes to perform an ICMP Echo test on the server.

Server Response The request/response time for converting a name into an address.

NT File Server

NFS File Server

The file server tests provide the following basic operations:

• Check server availability by logging-in to the server or with a partial log-in if a username and password are required for log-in but have not been provided by the user.

- The following operations are optional. If any of these operations is requested, the user must enter the full path name to the file (or directory) on the server:

    - Log in to the server.

    - Read from an existing file.

    - Write to, read from, and delete a file.

Test Setup

The first file server setup screen requests a name or address as well as login information needed to access the server.

Include domain name in the **User Name** entry, for example: abc@agilent.com.sg.
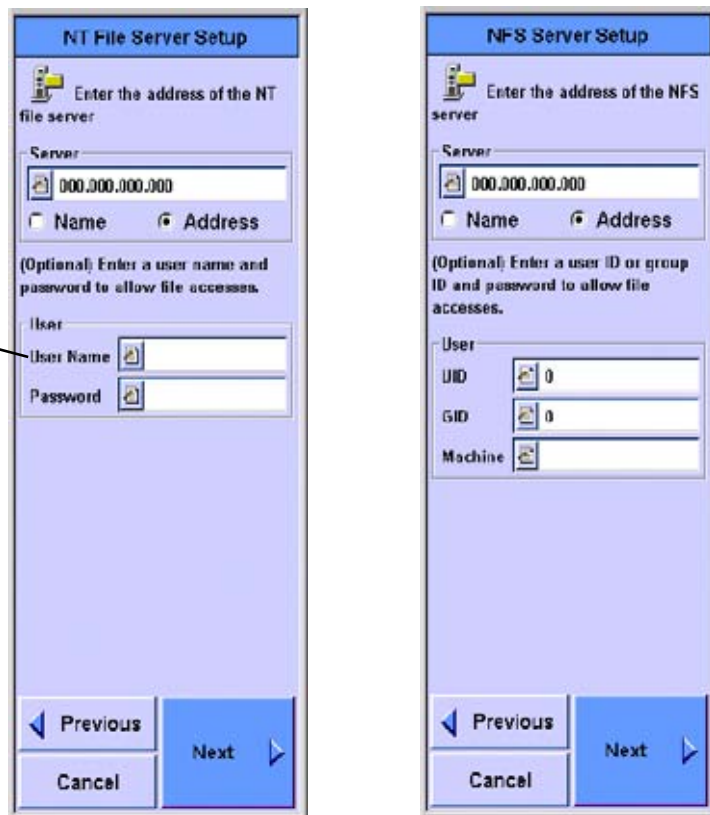
The next setup screen allows selection of the file actions to be tested.
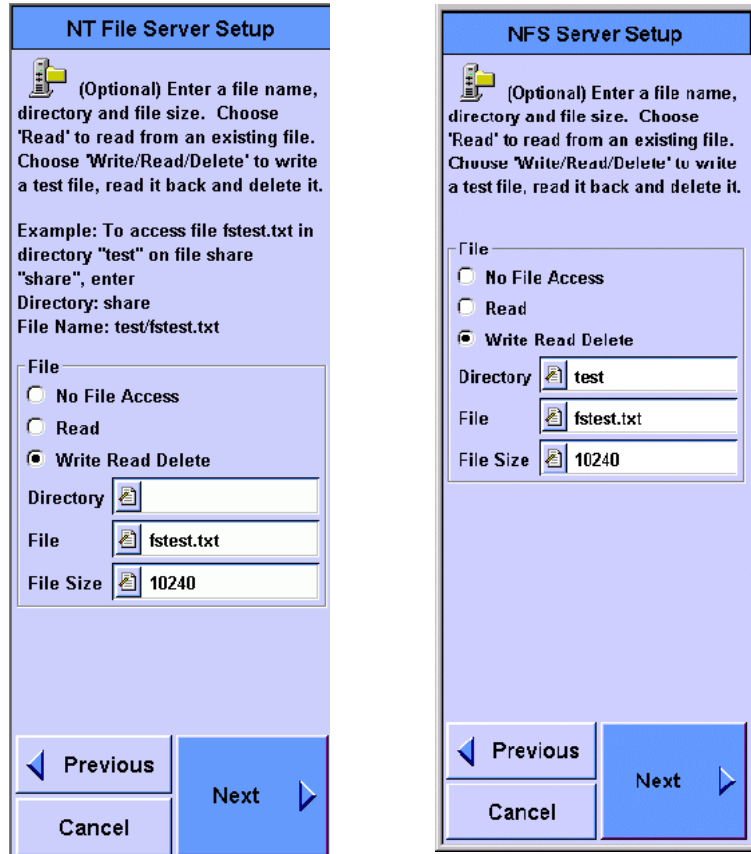
The last setup screen provides a list of the measurements performed during the test. Any of the thresholds used to rate the performance of each of these measurements may be viewed and modified by selecting it from this list and selecting Edit. Note that the scroll bar on the right of the screen only shows the location of the screen shown. Use the Scroll rocker to scroll through the list. The time responses are modified as shown in the DHCP server.
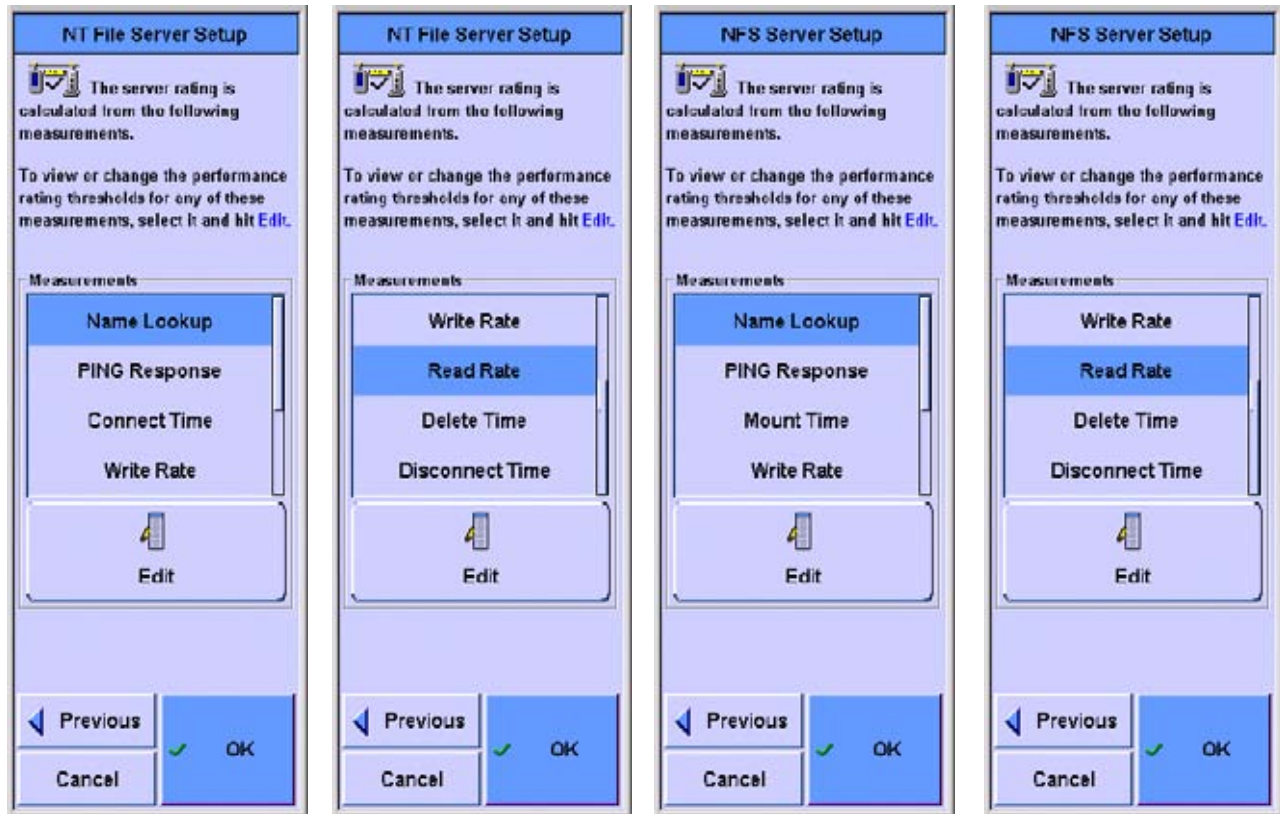
The measurements taken during this test are:

Name Lookup   The request/response time for converting a name into an address.

PING Response   The time it takes to perform an ICMP Echo test on the server.

Connect Time/Mount Time   The time it takes to connect to the NT file server, or mount the NFS server.

Write Rate   The bytes per second rating of the write operation.

Read Rate   The bytes per second rating of the read operation.

Delete Time   The time it takes to delete the file.

Disconnect Time   The time it takes to disconnect from the file server.

Examples of modifying rates and time are shown below:
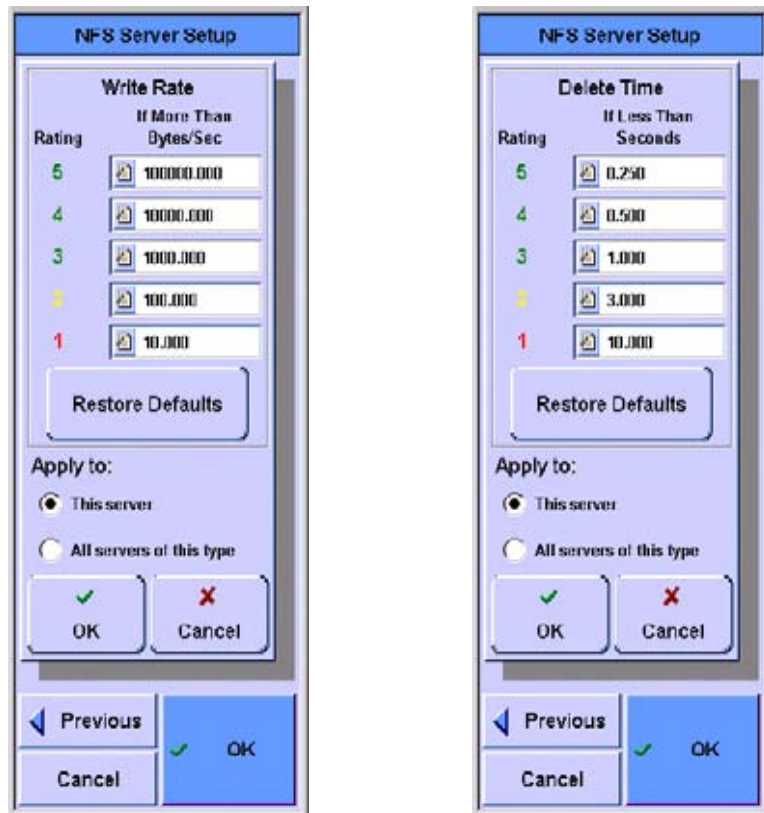
Web Server

The Web Server test verifies that server is accessible and measures the download time of the first HTTP get operation.

Test Setup

The first setup screen is used to enter the URL of the web server to test. The second setup screen provides an opportunity to request a proxy server and to name it. The last setup screen provides a list of the measurements performed during the test.

Any of the thresholds used to rate the performance of each of these measurements may be viewed and modified by selecting it from this list and selecting Edit.
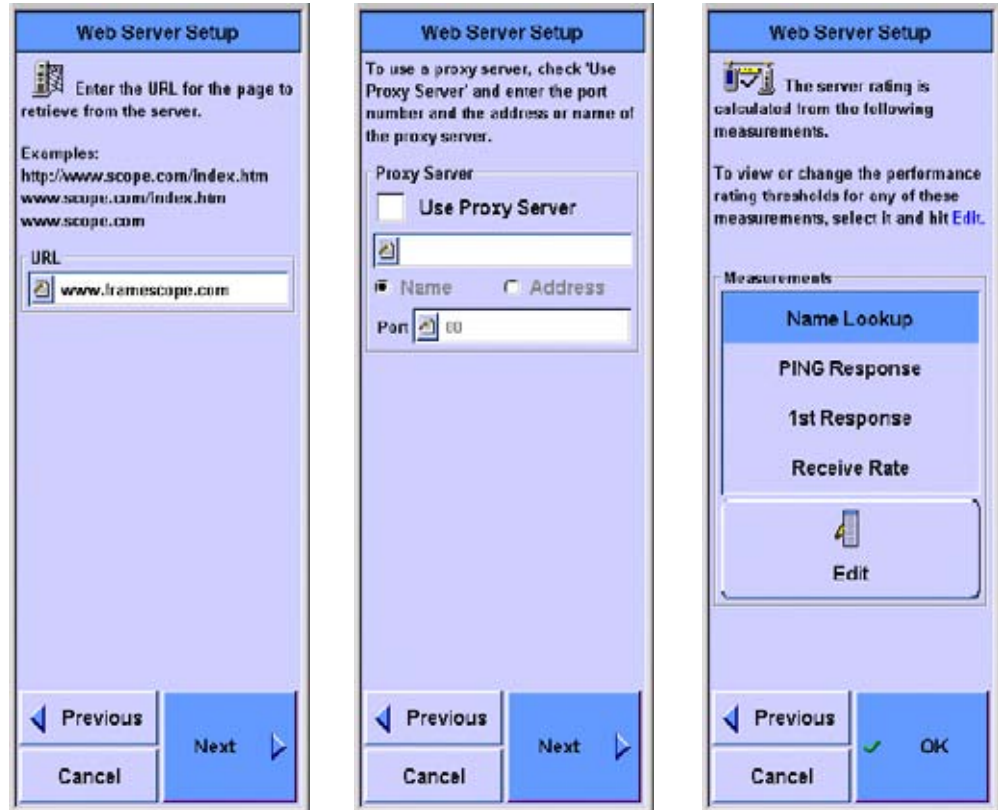
The measurements taken during this test are:

Name Lookup   The request/response time for converting a name into an address.

PING Response   The time it takes to perform an ICMP Echo test on the server.

1st Response   The time it takes to acknowledge the GET command.

Receive Rate   The rate in bytes per second for the download of the first data in response to the get command.
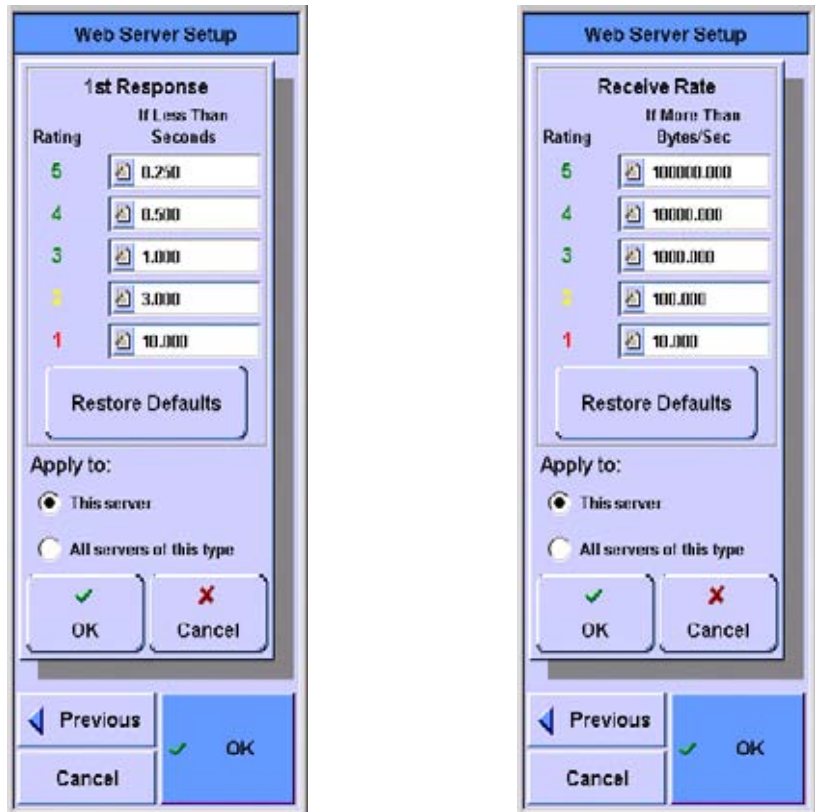
E-mail Server

The E-mail Server test verifies that the E-mail server is accessible and measures the access time and download rate of E-mail.

Test Setup

The first setup screen is used to enter the name or address of the E-mail server and enter the user name and password, if desired. The second setup screen is used to enter the operations to be tested and the send and receive methods as well as the ports used. Default port addresses are provided

The last setup screen provides a list of the measurements performed during the test. Any of the thresholds used to rate the performance of each of these measurements may be viewed and modified by selecting it from this list and selecting Edit.
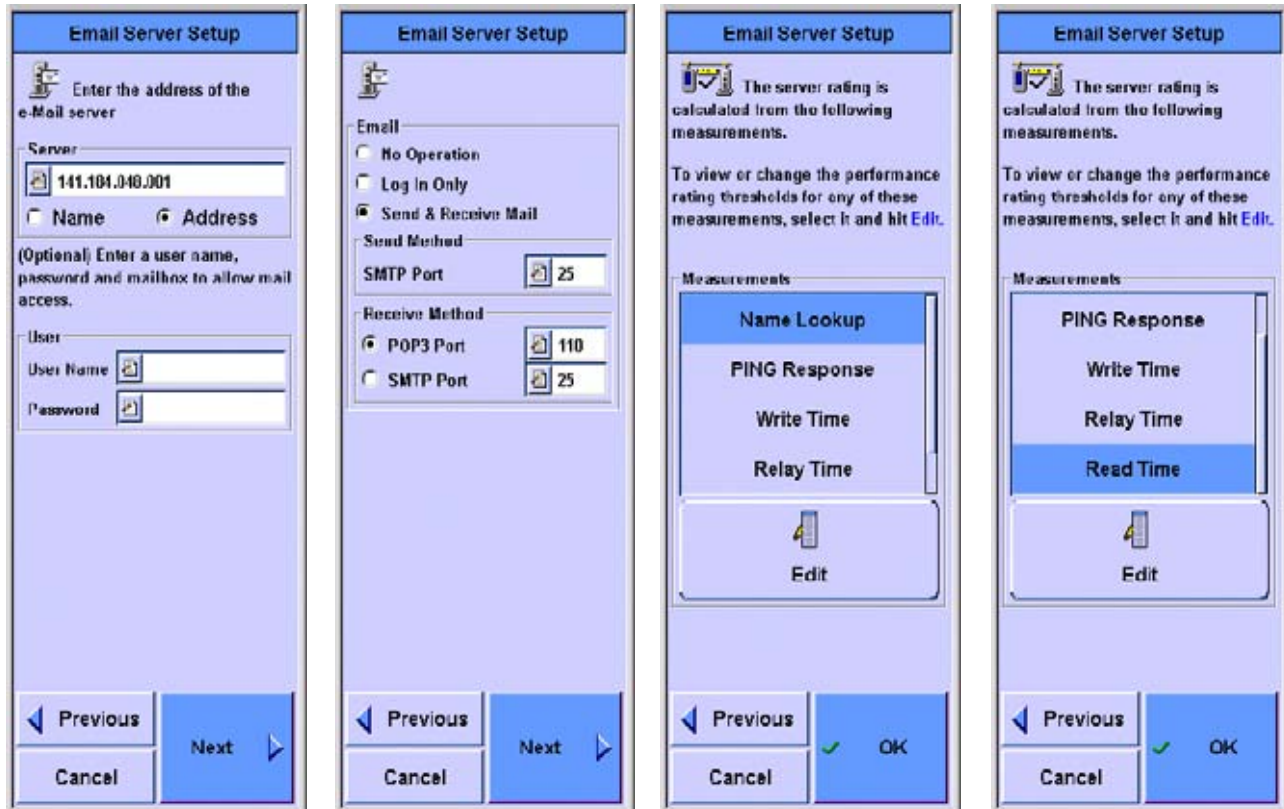
| NOTE | If e-mail server and e-mail domain names differ, the entry for User Name has to include its domain name. For example, if the e-mail server name is "pop3.agilent.com.sg" and the e-mail domain name is "agilent.com.sg", enter "abc@agilent.com.sg" in the User Name field. |

The measurements taken during this test are:

Name Lookup   The request/response time for converting a name into an address.

PING Response   The time it takes to perform an ICMP Echo test on the server.

Write Time   The time it takes to write to the server.

Relay Time   The time it takes to relay through the server and be available to read.

Read Time   The time it takes to read the E-mail using either POP3 or SMTP.

These times may all be modified by selecting the measurement and pressing **Edit**.

Novell Server

Print Server

FTP Server Autotest

The FTP Server Test allows users to test the designated server in three ways

- No File Access
- Read
- Write Read Delete

The name look-up time, connect time, disconnect time, read time, read rate, write time, write rate and file size results are presented accordingly.

Test Setup

First, the FTP server to be tested needs to be added. FTP servers are not discovered by Active Discovery.

1 Select Autotest on the main menu and click on Add.

2 Next, click on Create New and select FTP server.
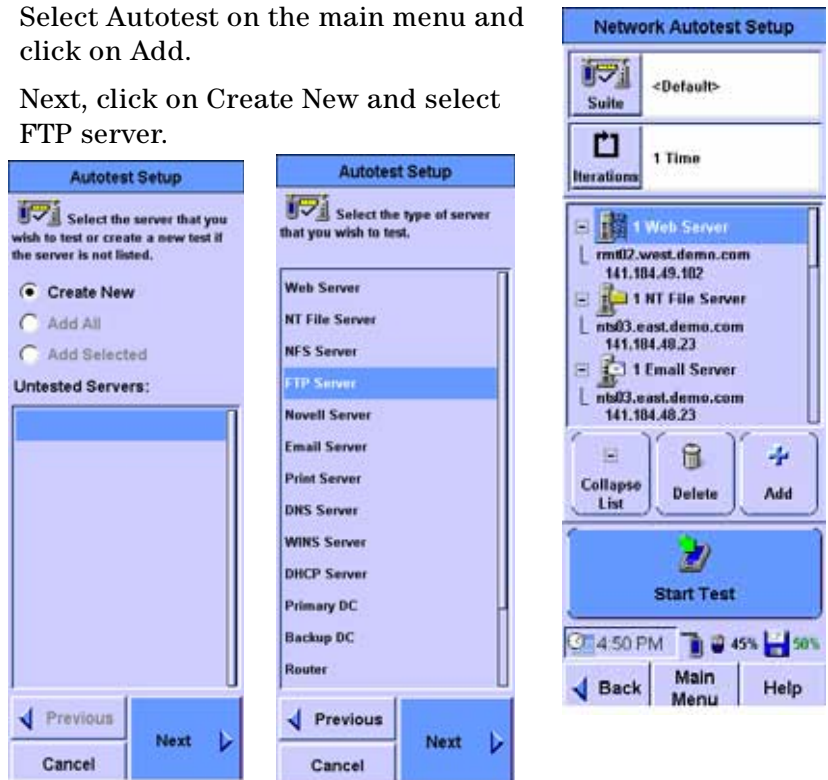
3 Users can enter user name and password to access the FTP server. If anonymous login is used, leave the username and password fields blank.
Enter the name of the proxy server and port if required. Both Active and Passive FTP transactions modes are supported. Click on NEXT to continue the setup.

If required, enter User Name and Password here. For anonymous login, leave these fields blank
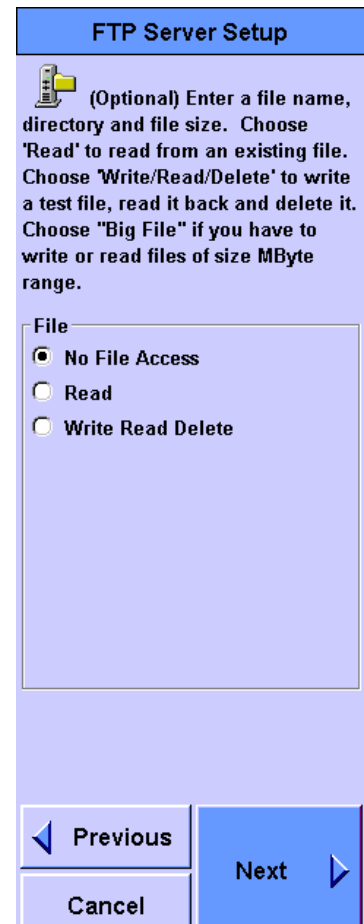
If required, enter name of proxy server and port number here

Check box if Active FTP transaction mode is used. Uncheck for Passive transaction mode

Three types of tests are available.

No File Access   This mode locates the FTP server, connects then disconnects from server.

Parameters tested are, Name Look-up, Tests Connect and Disconnect Time

FTP Server Setup

(Optional) Enter a file name, directory and file size. Choose 'Read' to read from an existing file. Choose 'Write/Read/Delete' to write a test file, read it back and delete it. Choose "Big File" if you have to write or read files of size MByte range.

File
- ⦿ No File Access
- ○ Read
- ○ Write Read Delete

◁ Previous

Next ▷

Cancel

Read This mode tests the FTP server by reading a file specified by the users which is found on the FTP server.

Parameters tested are, Name Lookup, Connect Time, Read Time, Read Rate and Disconnect Time.

Write Read Delete This mode uploads a test file generated by the FrameScope^{TM} Pro to the FTP server under test. The test then reads the test file back and FrameScope^{TM} Pro deletes the file it uploaded. Users can select the default file size or any size from 1000 bytes.

Alternatively, users can select the Big File option to specify files sizes in Mega Bytes and a file up to 1000MB can be uploaded, read back and deleted.

Measurement Parameters and ratings can be changed and customized accordingly. When the setup is completed, click on START TEST to begin.
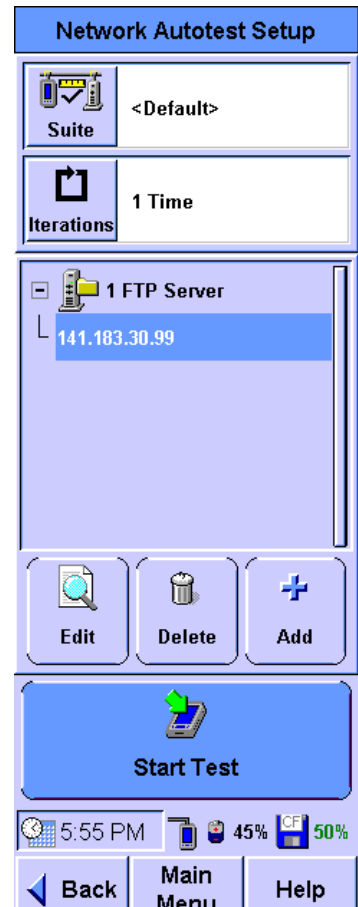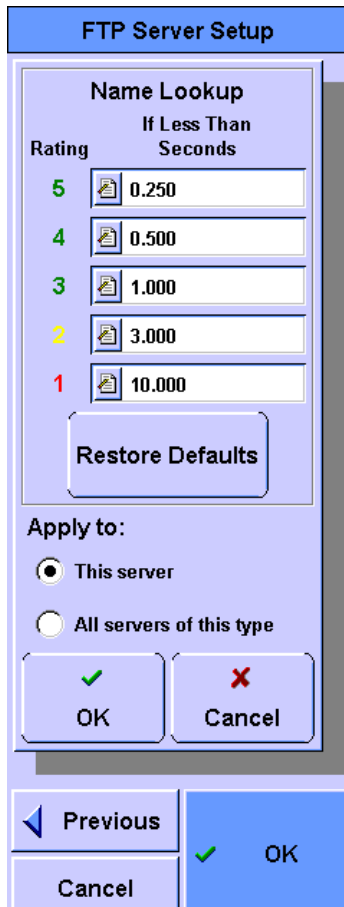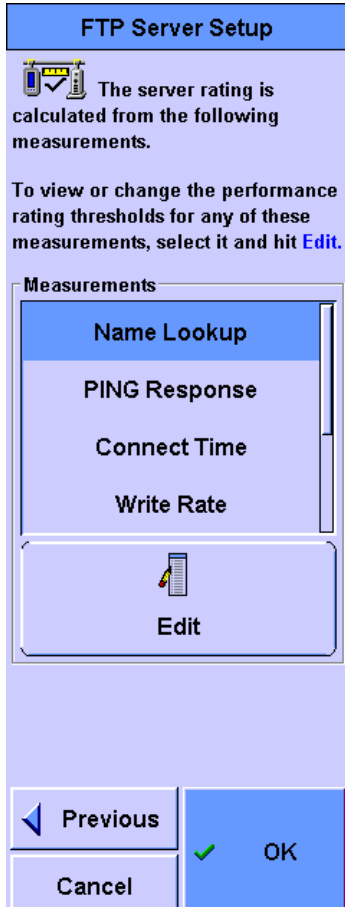
SNMP Agent

Primary Domain Controller

Backup Domain Controller

Router

Workstation

These tests verifies that the named device is accessible and measures the name lookup time and the ping response time.

Test Setup

The first setup screen is used to enter the name or address of the device to be tested.

The last setup screen provides a list of the measurements performed during the test. Any of the thresholds used to rate the performance of each of these measurements may be viewed and modified by selecting it from this list and selecting Edit.
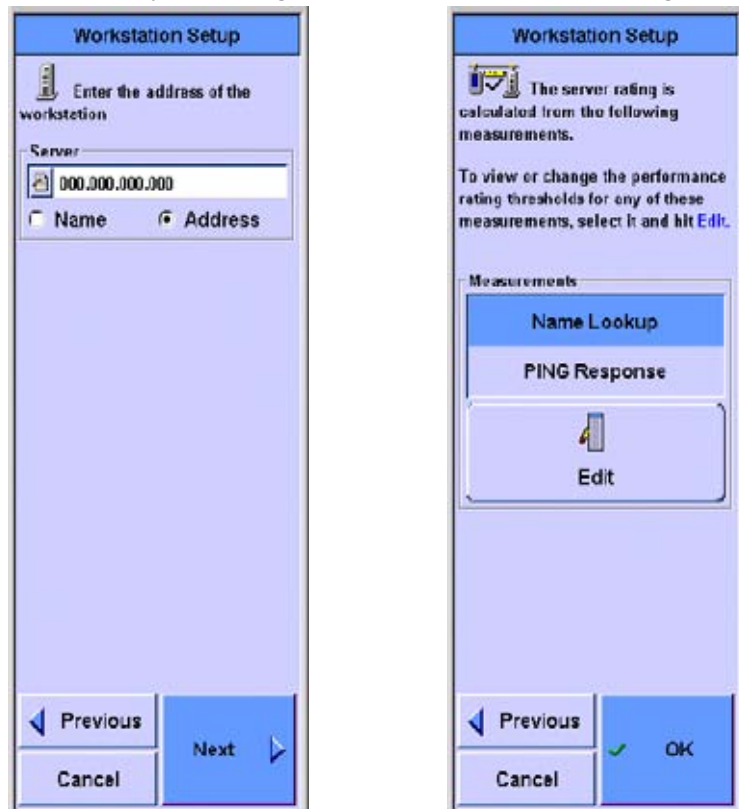
The measurements taken during all these tests are:

Name Lookup   The request/response time for converting a name into an address.

PING Response   The time it takes to perform an ICMP Echo test on the device.

Autotest Results

While the test is running, the overall status of each server test is displayed. As each test completes, it is given a performance metric. When all of the tests are completed, the overall performance metric is calculated and presented to the user. Details about each test result may be viewed. As an example of the details available, a web server test may require a DNS lookup, a PING response, a first response, and a page read operation. The status and time for each of these operations is presented in the detailed view.
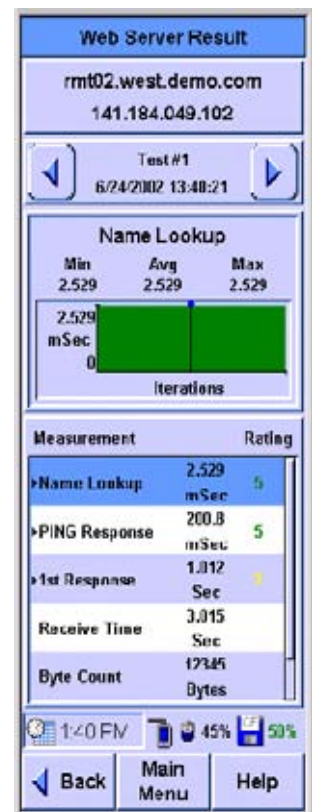
The Autotest may be left running in a loop with a programmable delay between each iteration of the autotest. This feature may be used to find problems that may only occur at certain times of the day. In this case, the response times for each test are

recorded and the current, average, minimum and maximum response times for each test are displayed after each test. When the autotest is finished, the response times for any test may be plotted.

Statistics

The first view into statistics provides the overall network health. The operator can drill down into the statistics to get more and more detailed information. Some of the more detailed information is gathered by software that may not have enough bandwidth to process 100% of the frames. So a value is presented for the percent of frames processed in these cases.

Overall Statistics

The current and maximum values of each statistic are displayed. Graphs of the each statistic are also displayed in strip charts. The interval at which the graph is updated is programmable so that the graph can cover the last 5 minutes in detail up to the last 24 hours with less details. The operator can obtain more information about any of these statistics by selecting it.

Utilization   Utilization values are displayed as percent of total network bandwidth. Pressing this statistic switches to a list of Top Transmitters.

Unicasts   The number of unicast frames or the percent of the utilization used up by unicast frames. Pressing this statistic switches to a list of Top Unicast Transmitters.

Multicasts   The number of multicast frames or the percent of the utilization used up by broadcast frames. Pressing this statistic switches to a list of Top Multicast Transmitters. Pressing any of the Top Transmitters brings up the Station Detail screen for that station.

Broadcasts   The number of broadcast frames or the percent of the utilization used up by broadcast frames. Pressing this statistic switches to a list of Top Broadcast Transmitters. Pressing any of the Top Transmitters brings up the Station Detail screen for that station.

Errors   The number of frames with errors or the percent of the utilization used up by frames with errors. Pressing this statistic switches to the Error Mix. Pressing on one of the Error Mix, will switch to a list of the Top Transmitter of that error type. Pressing any of the Top Transmitters brings up the Station Detail screen for that station.

Collisions   The number of collisions or the percent of the utilization used up by collisions.

Top Transmitters

A list of stations, sorted by a specific statistic is displayed. The statistic used for sorting is set when the list is created. For instance, if the user enters the Top Transmitters by pressing the Jabbers statistic in the Statistics screen the Top Jabber Transmitters is displayed. Pressing any of the Top Transmitters brings up the Station Detail screen for that station.

Error Mix

Long Frames   Any frame over 1522 bytes with a valid CRC and alignment. Pressing this statistic gets you to the Top Long Frame Transmitters.

Short Frames   Any frame under 64 bytes long with a valid CRC and alignment. Pressing this statistic gets you to the Top Short Frame Transmitters.

Jabbers   Any frame over 1522 bytes with a CRC or alignment error. Pressing this statistic gets you to the Top Jabber Transmitters.

CRC/Alignment Errors   Any valid sized frame with a CRC or alignment error. Pressing this statistic gets you to the Top Transmitters with an invalid CRC or alignment.

Protocol Mix

Selecting the protocol option gets you to the Top Transmitters of that protocol. Pressing any of the Top Transmitters brings up the Station Detail screen for that station.

- IP
- IPX
- ARP
- RARP
- Banyan
- DECnet
- SNA
- AppleTalk
- NetBIOS
- Spanning Tree
- Other

Saving and Retrieving Statistics Data

The Statistics Data can be saved on the main page of the statistics function. You can view a list of statistics data saved by clicking on the Database button.

To retrieve the saved data tables, you can either access the CF card using a card reader or via the FrameScope Pro configured as a web server. (Please refer to "Remote Control" on page 114).

Network Tools

Ping

The Ping tool is used to verify access to devices on a network. The current, minimum, maximum and average response times are displayed along with a count for the number of times there was no response.

This tool may be run in IP or IPX mode.   The IP Ping sends ICMP Echo frames to the target device. The IPX Ping can use either Diagnostic Responder or Ping frames.

The operator may alter the following parameters:

Target Device Address   The target device may be selected from a list or entered as a name or address. If an IP device is specified by a name, DNS and WINS are used to translate the name into an IP address. Names in IPX mode are translated using the SAP protocol.

Frame Size   Length of the frame, in bytes, including the FCS.

Number of Frames   Number of frames to send. If Continuous is selected, the FrameScope sends frames until the tool is stopped.

Time to Live (IP Only)   The maximum number of routers to traverse to the target device.

Don't Fragment (IP Only)   Selecting this option sets the Don't Fragment flag in the IP frame. This flag tells routers along the path that this frame should not be divided into smaller fragments.

Trace Route

The Trace Route tool is used to determine the route taken to a slave device. A list of routers found along the path to the slave device is displayed along with a count of the number of hops to each router and the response time for each router.

The operator may alter the following parameters:

Slave device IP address   The slave device may be selected from a list or entered as a name or IP address. If the device is specified by a name, DNS and WINS are used to translate the name into an IP address.

Maximum Hop Count   The maximum number of routers to traverse while tracing out the route.

SNMP Query

This tool uses SNMP to retrieve the following information from the device. This information is usually provided by IT services.

- MIB II System Group
    - System description
    - Up time
    - Contact
    - System name
    - Location

Locate Switch Port

This tool is used to determine the switch port to which a device is connected. SNMP is used to look for switches in the network. Each of these switches are probed to see if the device shows up in the switch's tables. All of the switch ports which are mapped to the devices MAC address are displayed. There is no order to the list for multiple results, so you cannot interpret the results as a direct path.

Performance Tests

The Performance Tests tool is used to verify the performance of a network between two network points. These tests are IP and MAC loopback tests, RFC 2544 throughput ,latency, frame loss rate and back to back tests. For details on each test, go to "Performance Tests" on page 53. Some points to note are:

- All loopback and RFC 2544 tests require a second FrameScope as a slave device.
- The MAC loopback test only works within the subnet (does not work across routers).

Traffic Generation

A hardware based traffic generation tool is provided to enable network testing under heavily loaded conditions. Hardware-based timers control the transmission of the user specified frames into the network.

The operator may change any of the following properties of the traffic being generated:

Frame Length   The number of bytes in the frame, including the FCS. This number ranges from 64-1518 unless long or short frames are specified. If the Short Frames box is checked, the frame size ranges from 40-63. If the Long Frames box is checked, the frame size ranges from 1519 to 16000.

Frame Rate   The rate at which frames are transmitted by the FrameScope. Changing the Frame Rate causes the Utilization to be recalculated.

Utilization   The percent of the Ethernet bandwidth which the FrameScope should fill up. This value ranges from 0 which causes no frames to be transmitted to 100 which causes the FrameScope to completely load the network connection. Changing the Utilization causes the Frame Rate to be recalculated.

 # Frames or Continuous   Specifies the number of frames the FrameScope should generate when the **Start** button is pressed. If **Continuous** is selected, the FrameScope begins generating frames when the **Start** button is pressed and does not stop until the **Stop** button is pressed or the Traffic Generator tool is exited.

Errors   Frames with errors may be generated. The error types include CRC error, short frame or long frame.

Frame Type
- 802.3/802.2
- Ethernet/IP
- SNAP/IP
- Ethernet/IPX
- 802.3/IPX
- 802.2/IPX
- SNAP/IPX

Source MAC   Choices include this FrameScope's MAC or simulate multiple (10, 100 or 200) stations. The simulated MACs use the values 00-0C-65-01-00-XX where XX increments from 01 to C8 (hex).

Destination MAC To send a frame to a station on the local LAN, enter its MAC address. If the destination address is set to FF-FF-FF-FF-FF-FF, the frame will be received by all devices on the LAN. To send a frame across a router, the router's MAC address should be used.

Source IP or IPX Source network address, if required. If Source MAC is set to simulate multiple stations, then the Source IP increments along with the MAC. For instance, if the FrameScope is set up to generate Ethernet/IP frames from multiple simulated stations with IP Address set to 209.6.108.202, then the first two frames would be addressed as follows:

Frame Number	MAC Address	IP Address
1	00-0C-65-01-00-01	209.6.108.202
2	00-0C-65-01-00-02	209.6.108.203

Destination IP or IPX Destination network address, if required.

Remote Control

A web server is implemented in the FrameScope Pro to provide a means to control and monitor the FrameScope Pro via a web browser.
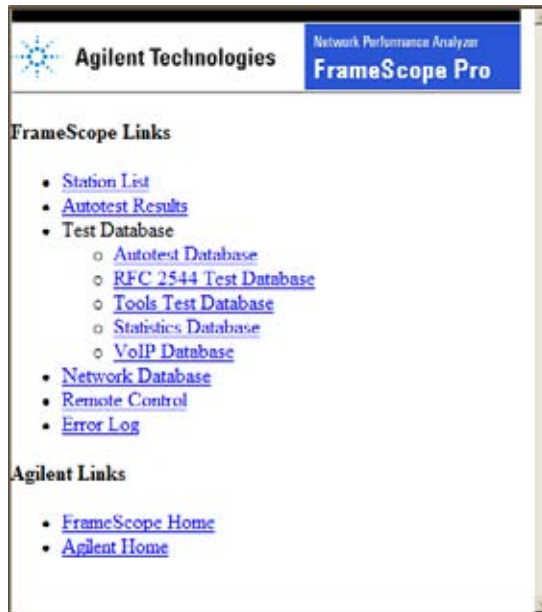
The FrameScope's home page provides links to the following FrameScope functions:

Station List   Links to the current list of stations. This is the same list that is accessible on the FrameScope through the Tools -> Network Database buttons.

Autotest Results   Links to the current autotest results.

Test Database   Links to a list of stored test results from the following test tools:

- Autotest Database - links to a list of stored Network Autotest results.
- RFC 2544 Test Database - links to a list of RFC 2544 throughput,latency,frame loss rate and back to back test results.
- Tools Test Database - links to a list of MAC and IP loopback test results.
- Statistics Database - links to a list of saved statistics data.
- VoIP Database - links to a list of VoIP test results.

These results may be viewed directly as web pages or the result file may be uploaded to a PC. The result file contains all of the results for the test in Comma Separated Value (CSV) format for use in spreadsheet programs.

Java^{TM} generated reports are available for RFC2544 and VoIP tests.

A User defined logo can now be included into Java Test Reports, via the CF memory card.

To display logo in Java report, save the the image file of the logo, in the size 250 pixels wide by 40 pixels high, as a .GIF file, with the name customer.gif, in the directory "<drive>\WSDATA1.0\logo\" on the Compact Flash Memory Card.

The report will automatically scale the logo if it is larger, however, providing an image with the recommended resolution will provide a better effect.

By default, when users press the SAVE button, the FrameScope creates a logo directory and "customer.gif" logo file with the logo of Agilent Technologies.

| NOTE | If the FrameScope is currently running one of the tools (Autotest, RFC 2544, IP/MAC Loopback or Statistics) in any of the FrameScope screens, its respective stored data or test results in the FrameScope cannot be displayed. For example, if you are running Statistics on the FrameScope, you cannot view the Statistics database from the remote screen. |

Network Database   Links to a list of stored station lists. These station lists may be uploaded to the PC. The station lists are stored in Comma Separated Value (CSV) format for use in spreadsheet or database programs.

Remote Control   Links to a page which shows an image of the FrameScope's display. Clicking on this image has the effect of pressing the FrameScope's display. The display is updated when the user of the web interface clicks on the screen or every 10 seconds if no screen operations are performed.

Error Log   Links to a list of errors found on the network.

Memory Requirements

The FrameScope Pro requires a CompactFlash™ card to store test results and network station lists. The amount of memory that each Autotest result takes up depends on the number of test and the number of iterations that you set before starting the test. The results require about 600 bytes per test plus 150 bytes per iteration for each test. There is a limit of 100 tests and a limit of 100 iterations. Therefore, the maximum results size is about 1.5 MB.

The Autotest suite storage requirement is only 350 bytes per test, so the maximum size is about 35 KB.

The station list storage requirement is 250 bytes per station with a maximum of about 1500 stations, so the maximum size is 375 KB.

The FrameScope Pro does not use any of the 4MB of internal Flash memory for network test result storage.

The following table lists approximate record storage capacities when configured for a 32 MB removable CompactFlash™ card and for comparison, a 192 MB card. All sizes of CompactFlash™ will work as FrameScope Pro Network Autotest results storage.

Saved Test Results Capacities, assuming a 1 MB used for test suites and station lists

Autotest #	Iterations	Size of record	Capacity (# of Records)	
			32 MB CFlash Card	192 MB CFlash Card
10 Autotests	1	60 KB	516	3183
10 Autotests	100	156 KB	198	1224
100 Autotests	1	600 KB	51	318
100 Autotests	100	1.56 MB	19	122
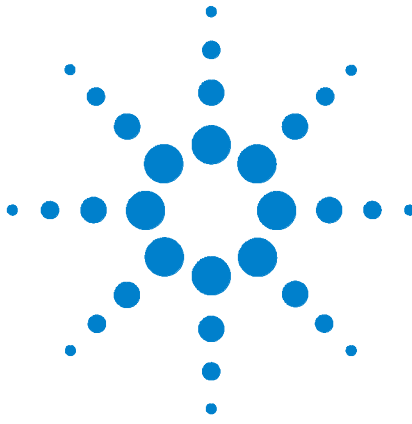
6

Specifications

Agilent Technologies

Physical

FrameScope Pro physical characteristics are:

Size	9.256″ x 4.944″ x 2.959″ HWD (234.2 x 126.0 x 75.2 MM.)
Weight	2.53 lbs. (1.15 kg)

Environmental

Indoor / Outdoor	Intended for indoor use; not weatherized
Operating temperature range	0 to 40ºC (32 to 104º F)
Storage temperature range	–10 to 55ºC (14 to 131º F) -20 to 55º C (-4 to 131º F)
Maximum humidity	80% for temperatures to 31ºC (88º F)
Altitude	To 2000 meters
Pollution degree	2

Agilent Technologies

DECLARATION OF CONFORMITY
According to ISO/IEC Guide 22 and CEN/CENELEC EN 45014

CE

Manufacturer's Name: Agilent Technologies International sarl
Manufacturer's Address: Rue de la Gare 29
CH-1110 Morges
Switzerland

Declares under sole responsibility that the product as originally delivered

Product Name: Framescope Pro - Network Performance Analyzer
Product Number: N2620A

complies with the essential requirements of the following applicable European Directives, and carries the CE marking accordingly:

- The Low Voltage Directive 73/23/EEC, amended by 93/68/EEC
- The EMC Directive 89/336/EEC, amended by 93/68/EEC
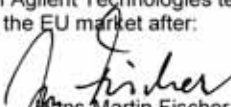
and conforms with the following product standards:

	Standard	Limit
EMC	IEC 61326:1997+A1:1998+A2:2000 / EN 61326:1997+A1:1998+A2:2001	
	CISPR 11:1997+A1:1999 / EN 55011:1998+A1:1999	Group 1 Class A
	IEC 61000-4-2:2001 / EN 61000-4-2:1995+A1:1998+A2:2001	4kV CD, 8kV AD
	IEC 61000-4-3:2002 / EN 61000-4-3:2002	3 V/m, 80-1000 MHz
	IEC 61000-4-4:2001 / EN 61000-4-4:1995+A1:2001+A2:2001	0.5kV signal lines, 1kV power lines
	IEC 61000-4-5:2001 / EN 61000-4-5:1995+A1:2001	0.5 kV line-line, 1 kV line-ground
	IEC 61000-4-6:2001 / EN 61000-4-6:1996+A1:2001	3V, 0.15-80 MHz
	IEC 61000-4-8:2001 / EN 61000-4-8:1993+A1:2001	30 A/m
	IEC 61000-4-11:2001 / EN 61000-4-11:1994+A1:2001	1 cycle/100%
	Canada: ICES-001	
	Australia/New Zealand: AS/NZS 2064.1	
Safety	IEC 61010-1:2001 / EN 61010-1:2001	
	Canada: CAN/CSA-C22.2 No. 61010-1:2004	
	USA: UL 61010-1:2004	

Supplementary Information:

The product was tested in a typical configuration with Agilent Technologies test systems.
This DoC applies to above-listed products placed on the EU market after:

2005-February-01
Date

Hans-Martin Fischer
Name

Product Regulations Representative PMD, DVS
Agilent Technologies
Title

For further information, please contact your local Agilent Technologies sales office, agent or distributor.

Template:A5971-5302-2, Rev. B.00   Issue Date: 2005-February-01   Revision: A

Electrical

Battery	A removable rechargeable Lithium (Li Ion)battery pack typically provides 4-6 hours of operation between charges, depending on use and power management settings. The battery has built in charger, that recharges the Li Ion pack in less than 5 hours. Extra battery packs are available. Battery pack specification: (Part Number N2595A-096) 7.4 V dc 3800 mAh
External power	Power converter: External ac to dc power converter (5183-8208) supplies 12 V DC, 1.5 A to the FrameScope Pro power connector. Power connector polarity: Positive (+) on the outer sleeve; Negative (-) on the tip.
Mains supply voltage	Must be within 10% of nominal voltage
Installation overvoltage	Category II

WARNING   **Use only the ac adapter supplied in the FrameScope Pro Kit. Using other power adapters may damage the tester, and will void its warranty.**

Ports

USB-Host and Client ports

The USB-B port allows the FrameScope Pro to connect to a PC equipped with a USB port or control external USB port (Host USB).

Card Bus Slot

Card Bus Slot is provided to cater for future enhancements.

Display

6.625" (16.83 cm) diagonal backlit color touch sensitive LCD.
Resolution: 240 (H) x 640 (V). The display is capable of
displaying text and graphics in up to 256 colors.

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Glossary

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Glossary

ARP   Address Resolution Protocol - A broadcast protocol used to discover the low level (MAC) address that corresponds to the higher level (IP, IPX, etc.) address.

Auto Discovery   Proactively requesting information about the network. Also called Active Discovery.

Auto Negotiation   The process of querying a switch or hub port to connect at the highest possible rate. The options include 10 or 100 Mbit Ethernet at half or full duplex.

Back-to-back   Fixed length frames presented at a rate such that there is the minimum legal separation for a given medium between frames over a short to medium period of time.

Bridge   A device used to expand a local area network by forwarding frames between data link layers associated with two separate cables. See also **router**.

Broadcast   A transmission addressed to all stations on a network.

Collision   The error that occurs when two stations attempt to transmit at the same time on an Ethernet network.

CRC Error   Cyclic Redundancy Check - An error detection scheme using a number derived from the data that is transmitted in the packet. The number is calculated by the sending station and stored in the packet. The receiving station, upon receipt of the packet recalculates the number and compares it to the stored value. If they are not the same, then the packet has changed erroneously during the transmission.

Community   A string or password for retrieving SNMP data from a station or device.

Default Gateway   The preferred system for providing access outside the local subnet. A gateway is a form of **Router**. In order for a station to access the stations on other subnets or the Internet, it must know the address of the system that controls access, this system is the Default Gateway.

Default Router   The router to which a packet will be sent if no specific entry in its route table directs it elsewhere.

DHCP   Dynamic Host Configuration Protocol - a procedure which allows devices that are entering or re-entering the network to request that certain parameters are automatically assigned to them. DHCP assigns a unique IP address. A device may request a subnet mask, default router address, name server address, and other parameters and addresses.

DHCP server   Any of several kinds of devices that provide DHCP services. These commonly include file servers and routers.

Diagnostic Responder   IPX echo tool (ping).

DNS   Domain Name Server or Domain Name Services. A capability used widely within both the Internet and corporate networks that resolves (or matches) names with IP addresses. For example, if a workstation needs to retrieve a web page from abc.com, a request containing the name abc.com is sent to a domain name server. That server, or another acting on its behalf, will respond with the IP address of the host at which the web page is stored.

DNS Domain   A Internet naming hierarchy such as Agilent.com

Domain Controller   In an NT environment, the domain controller has the responsibility for storing certain information about users, resources and devices on the network. There will be a primary domain controller and a backup domain controller. These are referred to as the PDC and BDC, respectively.

DSCP   Differentiated Services Code Point- Field in IP Packet which is used in the network for packet classification and traffic conditioning functions.

E-Mail   Electronic Mail - A system of sending messages and files across the network from one user to another.

E-mail Server   A device that stores incoming and outgoing E-mail messages. The protocol most often used for retrieving messages from the E-mail server to a user's workstation is POP3 (Post Office Protocol #3). Conversely, the protocol most often used to send E-mail messages from the workstation to the E-mail server is SMTP (Simple Mail Transfer Protocol.) SMTP is also used in order that the source and destination E-mail servers may exchange E-mails.

File Server   A generic term for a device that provides files upon request. It overlaps other commonly used terms such as Novell server, NT server, and Unix server, which are more specific because they indicate the operating system running in the file server. File servers often provide other functions such as remote access, DHCP, or security related services.

Frame   Data organized in bytes encapsulated with a header and a trailer containing information regarding the data. Frame and packet are sometime used interchangeably.

Frame Loss Rate   Percentage of frames that should have been forwarded by a network device under steady state (constant) load that were not forwarded due to lack of resources.

Frame Type   The format of the frame. Some examples are: SNAP/IP, SNAP/IPX, 802.3/802.2, EthernetII/IP, EthernetII/IPX, 802.3/IPX, 802.2/IPX.

FTP   File Transfer Protocol - Internet protocol for transferring files from one computer to another.

Hop   A data link through a bridge or router between stations on a network. For example: Agilent.com is 6 hops away from my PC.

ICMP   Internet Control Message Protocol - The IP layer protocol for handling errors and control messages.

IP   Internet Protocol. The protocol developed and used in the Internet. It is now used in nearly all public and private networks. It provides an addressing structure that allows relaying of packets in a manner that is logically separated from the underlying physical network. It is a connectionless, best effort protocol designed to work across dissimilar networks.

IP address   A four-byte address always written in decimal with each byte separated by dots. This is an address normally assigned through software and associated with a hardware address of a network interface card. It can also be associated with a resource on the network such as an SNMP agent.

IPX   Internetwork Packet Exchange - Novell Netware's network layer protocol, it handles network addressing, routing and packets.

Latency   The time interval starting when the last bit of the input frame reaches the input port and ending when the first bit of the output frame is seen on the output port.

Locate   Using SNMP, report the switch or hub port that a station is connected to.

MAC address   The unique address of each hardware component, NIC card, hub, switch, etc., on a network. These are assigned by the manufacturer of the networking equipment when the hardware is produced.

MAC Loopback   The process of transmitting and receiving packets at the MAC layer and reporting delay, the quantity transmitted and received as well as any errors which occur.

MIB   Management Information Base - A set of parameters that are available and sometimes customizable that an SNMP management station can query. Used to report status or configuration information of components of a network.

Multicast   A subset of a Broadcast where a packet is only delivered to a subset of all possible destinations that share a multicast address.

NFS Server   Network File System - A Sun Microsystems protocol allowing computers on the same network use data stored on other computers as if it were on local disks. An NFS server is usually a UNIX server.

Novell server   A device that provides services such as file services and print services in a network where a Novell operating system is being used.

Ping   A commonly used test which determines whether a device can be reached. Generally, from a command line a user types ping a.b.c.d <enter> to determine whether the device at IP address a.b.c.d can be reached.   The response is often an indication of the success of the test and a time stamp designating the length of the query-response, usually in milliseconds. The ping tests reachability by sending an ICMP echo request to the destination and waiting for a reply.

POP   Post Office Protocol - E-mail post office protocol that allows a single user host system to connect and download E-mail.

RFC 2544   This RFC defines specific set of tests to measure and report the performance characteristics of network devices.

RIP   Routing Information Protocol - An interior gateway protocol that allows groups of hosts on a LAN share routing information.

Router   A device that forwards traffic between subnets or connected networks.

RMON   Remote Monitoring - Using SNMP to read or control remote probes for network monitoring and troubleshooting.

SAP Request   Service Advertisement Protocol - A Netware protocol for publicizing the current network address of available services.

Server   A computer or service that is shared among stations on the network. Any device in the network that provides services upon request.

SMTP   Simple Mail Transfer Protocol - The Internet electronic mail protocol used to transfer mail between hosts.

SNMP   Simple Network Management Protocol - A standard protocol used to manage nodes on an IP network.

SNMP Agent   Devices that are being managed in a network can contain an SNMP agent. A network management program or device sends a query to the agent. The agent retrieves the requested value from a database stored in the managed device and sends the reply. SNMP agents often retrieve and reply with statistics about the managed device. Examples include utilization values on ports, address tables that are stored, and vendor profiles. The protocol used to communicate the information is the Simple Network Management Protocol (SNMP).

Station   A computer on the network.

Statistics   The measurement of key network parameters such as utilization, frame and protocol traffic.

Subnet   A portion of the network that shares a network address with other subnets.

Subnet Mask   A bit mask used to identify which bits in an IP address apply to the subnet.

Time to live   A field in an IP packet which indicates how long the packet should be allowed to exist before being discarded.

Traceroute   A Ping like tool that reports the number of hops to the destination as well as the time delays to each hop along the way. Traceroute is useful for locating bottlenecks in network traffic.

Type of Service   A field in an IP packet that controls the quality of service that the packet requires. The internet is a "best effort" network, using the Type of Service bits, higher grades of service can be requested. If the network equipment supports better service i.e. VoIP, the better service will be provided.

Unicast   A frame sent to a specific single destination.

UNIX server   A device providing services in a network and running a version of the Unix operating system. A UNIX server is usually an NFS server.

Utilization   A measure of how much of the network's bandwidth is being used. It is usually expressed as a percent of the maximum line speed in the network. For example, if the network's current usage is at 2 Mb/sec and the bandwidth available (line speed) is 100 Mb/sec., we say the utilization is 2%.

Web Browser   The program running in a client host when someone is interacting with a web server. It is the software used to browse the Internet.

Web Server   A network server that contains files that describe Internet pages. The pages are usually developed in a language named Hypertext Markup Language (HTML). A company's home page is an example of an HTML file that can be retrieved from a web server.

WINS Server   A type of name server used in the Microsoft NT environment. WINS stand for Windows Internet Name Services. It is a variation of DNS.

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